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Long Term Educational Attainment in the United States

INTRODUCTION

Mass higher education is in many ways closely linked to occupational preparation, historically no stranger to the American campus. Limited national resources and the spectre of a surplus of highly trained manpower produced by higher education have combined to make popular the "manpower model," which has become the means by which state and federal government will create legislation and budget allocation for the operation of the educational enterprise. Higher education will be most directly affected because of the relatively large investment per student necessary to the quality degree product which flows from universities and colleges.

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There is currently much misinformation about what snapshot manpower statistics really mean, and interpretations of the many and various manpower projection models are confused. The projection of manpower supply and utilization is an uncertain art, and, in the end, depends upon how well we articulate long-range national goals and objectives and upon how much of our national wealth we invest in specific sectors of the economy.

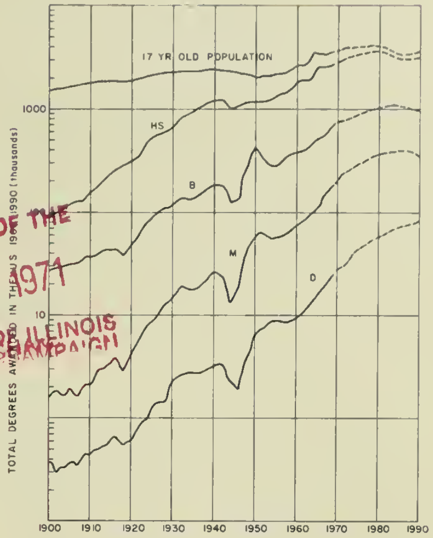
> "Some planners indicate that if we give high national priority to a number of other pressing national goals, there would be no surplus of doctorates. That of course is the difficulty in predicting the future. All future estimates are built on a little experience, many assumptions, and much speculation about events and priorities."[1]

The purpose of this paper is to examine the long-term trends in degree productivity and the effects of national policy and decision making upon those trends. From an understanding of what has gone before, a rational approach to future policy determination will hopefully be founded upon a better understanding of the future alternatives available for investment of national wealth.

HISTORICAL PERSPECTIVE

Figure 1 presents a comparison of the seventeen-year-old population and the total high school, bachelors, masters, and doctorate degrees awarded each year in the United States from 1900 through 1969, with the latest Office of Education projections of degrees to be awarded through 1980. The Office of Education methodology was employed to extend these projections through 1990.* In a later section of this paper an alternative projection will be proposed as a more likely figure for 1980, but at this point, for purposes of discussion, the Office of Education projections are presented as a base from which certain future policy decisions can be discussed.

FIGURE 1



The important features of Figure 1 are (a) the fact that high school graduates derived from the seventeen-year-old population are increasing at a decreasing rate as the number of high school graduates approaches 100 percent of the high school age population; (b) the growth in the award of baccalaureate degrees approximately parallels the growth of high school graduates since about 1920; (c) the growth in the award of masters and doctorate degrees exceeds the growth rate of baccalaureate and high school awards.

The long-term trends show major short-term fluctuations which can be related to the nation's involvement in major wars and to the major economic down-turns and prosperity since 1900. Of particular interest is the rapid growth of educational attainment which occurred during the 1920's and the 1960's. During the 1920's, state appropriations and private gifts to higher education underwent dramatic increases from the outlays derived from these two sectors in the past.[2]

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* The data and projections were supplied by Dr. R. C. Carey, University of Illinois Bureau of Institutional Research.

> "Growth — in student numbers, and the size of university budgets and physical plant — these were the characteristic developments of the 1920's."[2]

This investment during the 1920's resulted not only in increased attendance in institutions of higher education but also in the increased production of faculties for the growing enterprise. The similarity in the experience of the 1920's and the 1960's is remarkable. One interpretation of the slowing in the growth rate of the educational enterprise during the years of the depression is that "the net effect of the depression was not to reduce, but to stabilize the number of students enrolled in colleges."[2]

It is tempting to juxtapose this interpretation of what happened in the 1920's and the 1930's to the present, which marks a somewhat similar circumstance at the end of the 1960's and the beginning of the 1970's; this recognition, however, should not obscure the fact that investment in human resources can itself transform "economic realities" as well as the entire social and environmental setting in which the activities occur.[3]

DEMOGRAPHY AND DEGREES

A source of confusion in understanding the growth of higher education is the fact that no clear distinction is usually made between the total magnitude of growth and the relative rates of growth of the several sectors comprising the higher education enterprise.

The potential size of student demand for higher education is usually embodied in the statistic referred to as the "enrollment rate." The enrollment rate is intended to provide an index of the propensity for college attendance. It is a factor which presents the total number of students enrolled on campus (of any age group) divided by the current college age population (ages 18-21 inclusive). The current enrollment rate for higher education is estimated to be approximately 50 percent for the nation; in 1980 it is projected to be approximately 55 percent. (The current enrollment rate for the State of Illinois is 60 percent and is projected to be approximately 75 percent in 1980.)[4] The numerator of this factor represents a combination of different and distinct groups of students enrolled in junior colleges, undergraduate programs at four-year colleges and universities, and graduate and professional programs at colleges and universities. It is this combination of different groups of students which gives the enrollment rate statistic its complexity. Any future projection of enrollment rates based upon the mere projection of recent enrollment rate trends is misleading, since enrollments in junior colleges and other two-year institutions have increased dramatically during the past decade. In addition, there is an increased tendency for students to remain in the educational system beyond the attainment of the bachelors degree, as we have witnessed in the rapid growth of enrollment for advanced degrees. These two growth rates have coupled to distort any statistical correlation between total enrollments and total degree output.

In order to avoid this distortion, a much more informative model is based upon a graduating cohort of high school students expected to obtain a baccalaureate-level degree four years after graduation from high school, a masters-level degree approximately six years after graduation from high school, and a doctorate approximately ten years after graduation from high school. Students usually graduate from high school when they are seventeen or eighteen years of age. If they attend college, and if they perform acceptably, they progress to the four-year baccalaureate by age 21 or 22. The median time necessary to advance from the baccalaureate to the masters level is from one and one-half to two years. The median years from baccalaureate to doctorate is reported to be somewhat more than five years of registered time and approximately eight years of total time.[5] The model developed in this paper and the plots in Figures 2 through 7 use the following age groups as the base from which the four degree levels are derived for any particular year: (a) 17 plus 18 year olds divided by two equals the population base for high school graduates; (b) 21 plus 22 year olds divided by two equals the population base for bachelors degrees; (c) 23 plus 24 year olds divided by two equals the population base for masters graduates; (d) 27 plus 28 plus 29 year olds divided by three equals the population base for doctorate graduates.

Figure 2 presents a comparison of the growth of the total population of the United States and the growth of the

FIGURE 2

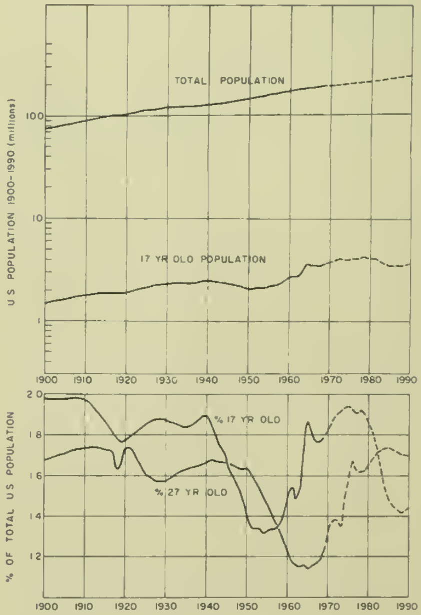


FIGURE 3

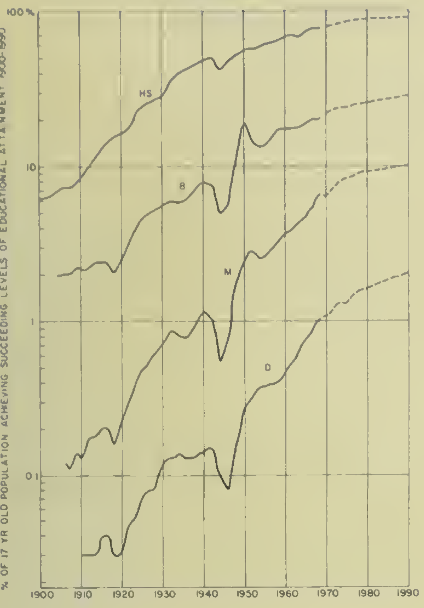


FIGURE 4

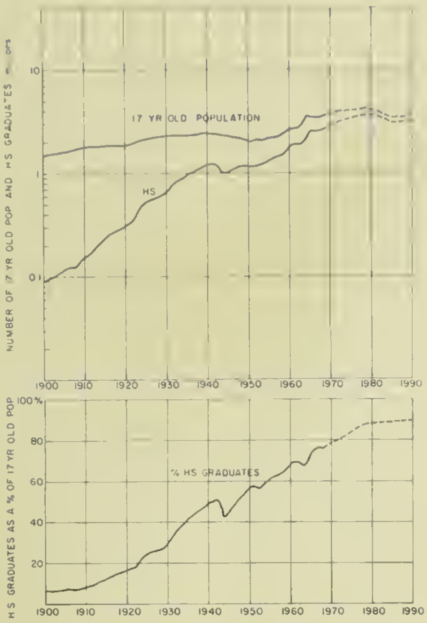


FIGURE 5

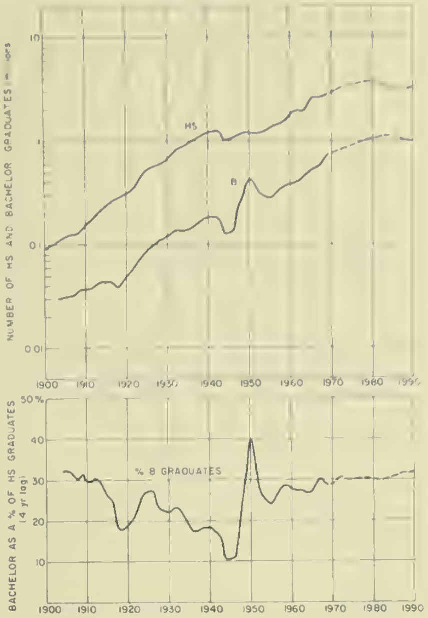
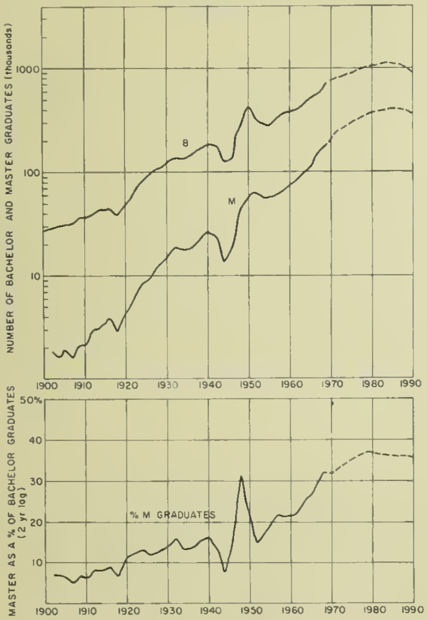


FIGURE 6



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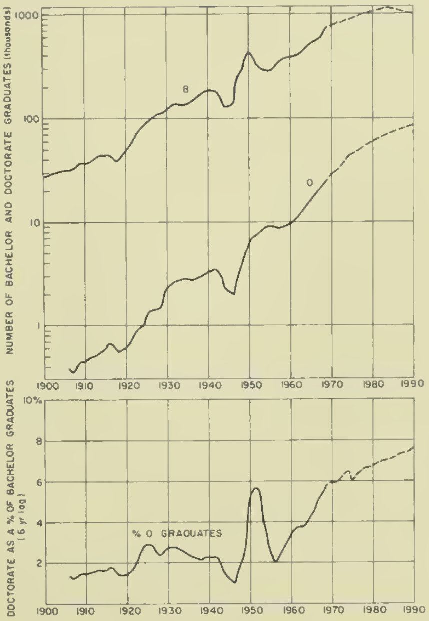


seventeen-year-old population. The bottom half of Figure 2 presents the seventeen-year-old population (17 plus 18 divided by two) and the twenty-seven-year-old population (27 plus 28 plus 29 divided by three) as a percent of the total population. These two age groups encompass the normal time span during which the award of degrees has historically been observed. These age groups are, for all practical purposes, the population base for the high school diploma and for the doctorate degree.

Although the lock-step pattern of education assumed by this model may change, several references can be studied to show that there is substantial evidence for the realism of this model and in the aggregate it is valid for our purposes.[5, 6]

The model, therefore, establishes the seventeen-year-old population as the only independent variable which can be used in studying the effects of past and future policy-making upon the growth rates of the various levels of educational attainment. In this respect, it is important to note that the available population from which can be drawn the future enrollments in higher education — the seventeen-year-old population — peaks in the late 1970's and begins to decrease in the late 1980's. Since we must plan for the trained manpower required to sustain a burgeoning population which apparently begins to decrease its rate of growth at the end of the century, we must also note that, as a percentage of this total U.S. population, the high school age population peaks in 1978, the baccalaureate age population peaks in 1982, and the masters and doctorate population peaks in the mid- to late 1980's. The importance of these considerations can of course be obscured by new educational "delivery systems."

OBSERVATIONS DERIVED FROM THE DATA

The model which has been developed defines the higher education "pipeline" as approximately a ten-year period extending from the award of the high school diploma through the period during which we would normally expect to award the bachelors, masters and doctorate degrees. Figure 3 incorporates the implicit lags between each of these degree levels and presents the percent of high school age population achieving succeeding levels of educational attainment over time since 1900. Again it can be noted that the baccalaureate degrees parallel the high school awards, while the percentage of masters and doctorate degrees awarded to the high school age cohorts is increasing over time.

Figures 4 through 7 present a comparison of each of these levels of educational attainment with the previous degree base from which they are derived. The bottom half of these figures present each degree as a percent of the previous degree base. The conclusions to be gleaned from Figures 4 through 7 are: (a) high school awards are asymptotically approaching the total high school age population; (b) baccalaureate awards as a percent of high school awards have been most sensitive to wars and economic fluctuations, but, it can be observed, have established a fairly long-term constant relationship with high school awards at approximately 30 percent of an increasing number of high school graduates; (c) masters awards as a percent of baccalaureate awards show a long-term, fairly constant rate of increase up until 1960 when this rate of increase accelerates dramatically; (d) doctorate awards as a percent of baccalaureate awards demonstrate sensitivity to wars and economic fluctuations, and also demonstrate a fairly constant rate of increase until 1960 when this rate of increase also accelerates dramatically.

It is apparent that while the nation has expanded educational attainment up to and beyond the baccalaureate level, the baccalaureate degree itself has stabilized as a "gate." There have been real increases in educational attainment on either side of the baccalaureate degree resulting in a "bi-modal" distribution of educational attainment. Beyond the baccalaureate it has been possible to increase relatively the master and doctorate degree productivity, most recently in the post-sputnik period. In the meantime, the public education system has consistently raised the general level of ability in the population as a whole by providing public education at the elementary and high school levels. In the last half of this century, a high school education has become the norm of educational attainment for the youth of the nation. Furthermore, during the last decade, a new goal for American education has been to provide the youth of the nation with an opportunity for at least two years of education beyond high school. This goal is rapidly being realized through the phenomenal growth of various types of two-year colleges which attract a highly diversified group of students, including a substantial number of individuals from minority groups, low income families, or educationally disadvantaged backgrounds. Four-year colleges and universities are less likely to enroll large numbers of these students, since such institutions tend to be more selective, more expensive and generally not located near urban areas.[8]

The junior colleges (community colleges) currently enroll some two million students out of the total higher education enrollment of approximately eight million students. The number of two-year institutions of higher education has increased from approximately 500 in 1959 to approximately 800 in 1969.[9]

Table 1 presents the summary of headcount enrollment in all institutions of higher education for 1959-60 and 1969-70. The table illustrates that the dramatic increase in total enrollment has occurred primarily in the public sector and in the two-year institutions. Table 2 illustrates that, as a percent of total enrollment in all institutions of higher education, the two-year institutions have gained a significant proportion of the total enrollments, while the four-year institutions have lost a similar proportion of the total, and enrollment in graduate programs has remained at about a constant proportion of the total headcount enrollment in all institutions of higher education.

Table 3, a summary of earned degrees awarded by all institutions of higher education, illustrates increased degree output which can be compared to the increased enrollment emphases described in Table 1. In each of the degree levels awarded by institutions of higher education, the increase in degree output over this period exceeds the corresponding increase in enrollments which have been observed. This observation is even more significant when we consider that there is an implicit lag between enrollment increase and degree output.

The effect of the junior college sector upon the expansion of higher education is also obvious from the fact that, although up to the late 1950's baccalaureate degrees represented approximately 60 percent of first time degree-credit enrollment in all institutions of higher education, this percentage has decreased to approximately 50 percent at the current time. Baccalaureate degrees as a percent of first time degree-credit enrollment is projected to

TABLE 1. SUMMARY OF HEADCOUNT ENROLLMENT IN ALL INSTITUTIONS OF HIGHER EDUCATION 1959-60 AND 1969-70[1]

	1959-60	*1969-70*	*% Change 1959-60 to 1969-70*
Total Enrollment[a]	3,571,000	7,697,000	+116%
Public	2,134,000	5,619,000	+163%
Private	1,438,000	2,077,000	+ 44%
Degree Credit	3,377,000	7,087,000	+110%
Non-Degree Credit	194,000	610,000	+214%
Degree Credit in:			
Two-year Institutions	410,000	1,341,000	+227%
Four-year Institutions[b]	2,636,000	4,948,000	+ 88%
Graduate Programs	331,000	798,000	+141%
Non-Degree Credit in:			
Two-year Institutions	153,000	527,000	+244%
Four-year Institutions[c]	41,000	83,000	+102%

[1] From USOE Projections of Educational Statistics to 1978-79

[a] Rounding of figures prevents adding to exact totals in all columns

[b] Including professionals, excluding graduate students

[c] Including professional and graduate students

TABLE 2. DISTRIBUTION OF TOTAL HEADCOUNT ENROLLMENT IN ALL INSTITUTIONS OF HIGHER EDUCATION 1959-60 AND 1969-70

	1959-60		*1969-70*	
Total Enrollment	3,571,000	100%	7,697,000	100%
Two-year Institutions	563,000	16%	1,868,000	24.5%
Four-year Institutions	2,677,000	75%	5,031,000	65%
Graduate Programs	331,000	9%	798,000	10.5%

TABLE 3. SUMMARY OF EARNED DEGREES AWARDED BY ALL INSTITUTIONS OF HIGHER EDUCATION 1959-60 AND 1969-70[1]

Degrees	*1959-60*	*1969-70*	*% Change 1959-60 to 1969-70*
High School	1,864,000	2,969,000	+ 59%
Associate[2]	48,613	184,113	+279%
Bachelors & First Professional	389,183	772,000	+ 98%
Masters	77,692	211,400	+172%
Doctorate	9,829	29,000	+195%

[1] From USOE Projections of Educational Statistics to 1978-79

[2] Associate degree data was not reported nationally in 1959-60 and is not available for 1969-70. Figures presented above for associate degree are for 1958-59 and 1968-69.

drop to 45 percent by 1980, indicating that (in the absence of a national policy change) an increasing proportion of high school graduates will be provided education beyond the high school level, but that these people will not achieve the baccalaureate level in large numbers.[10]

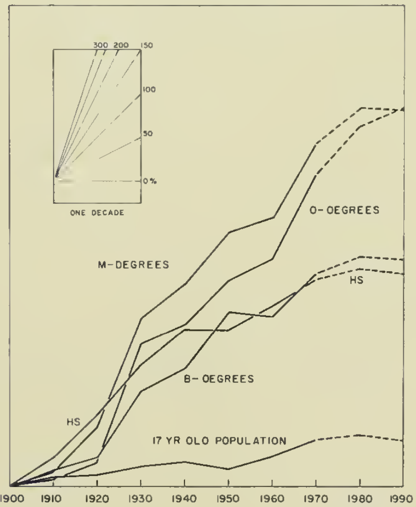
That junior colleges are primarily preparatory for continued advancement toward the baccalaureate is a myth. The fact is that only about five percent of these students currently transfer to four-year colleges and universities.[11] Recent studies have shown, however, that there are large numbers of junior college enrollees, who, if they were so predisposed, and if it were made financially possible, would transfer to senior institutions in large numbers.[8]

THE PROJECTIONS

The relative rates of growth of the four levels of educational attainment (high school, baccalaureate, masters, doctorate) are presented in Figure 8 for each decade since 1900. Since the middle 1940's, high school and baccalaureate awards have increased at approximately the same overall rate. The emphasis upon masters and doctorate output is a long term trend originating in the 1920's. The most recent emphasis upon masters and doctorate output during the 1960's affects the Office of Education projection methodology, which is based chiefly upon an extrapolation of recent trends. For example, during the 1960's the percentage growth rate of doctoral production in all fields varied between a ten and twelve percent annual growth rate. If this growth rate were sustained, doctoral production would approach 90,000 degrees per year by 1980. The Office of Education projection of some 60,000 doctoral degrees by 1980 would require an annual growth rate of some eight percent. The overall long-term growth rate of doctorate produc-

FIGURE 8

% CHANGE OF DEGREES AWARDED EACH DECADE (1900-1990)

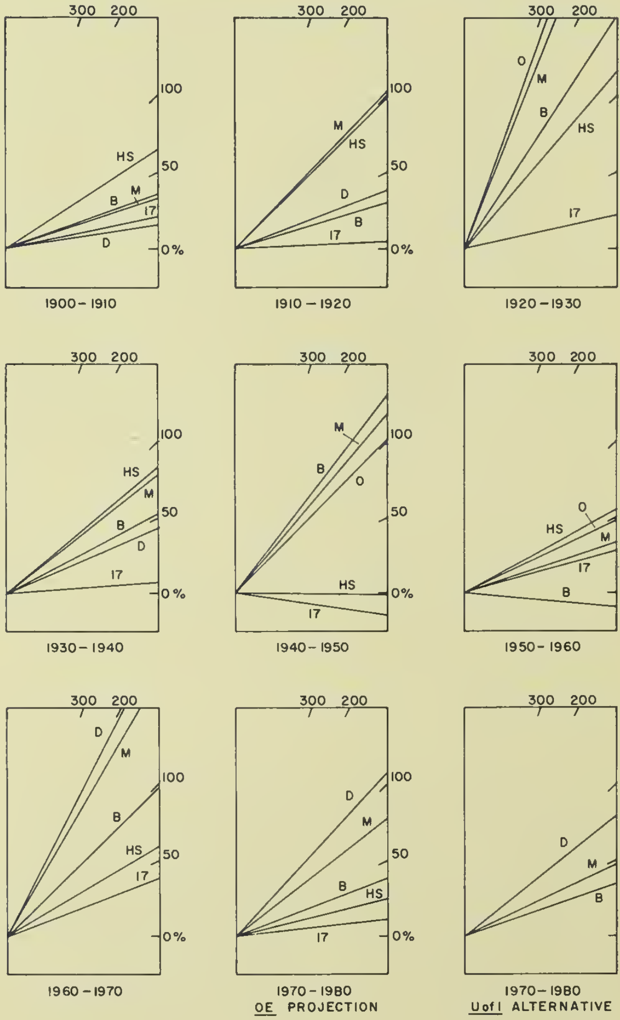


tion has been about six percent per year; if this growth rate were applied to the estimated 1970 doctorate base, by 1980 the annual doctorate production would approximate 50,000 degrees per year. The projections of Allan Cartter,[12] of Folger, Astin and Bayer,[13] of the National Science Foundation,[14] and of a study performed by the University of Illinois in 1969[15] indicate that by 1980 a doctorate supply of approximately 50,000 graduates per year can be achieved. But there is little agreement as to the distribution of these graduates by areas of study.

Figure 9 presents for each decade since 1900 the percent change of degrees awarded each decade, as derived from the long-term growth curves of educational attainment presented in Figure 8. (Table 4 provides a conversion of percent increase per decade to an annual compound rate of growth.) These decade "snapshots" portray the relative emphasis placed by the nation upon each of the levels of educational attainment in respect to the others, and they portray the rate of growth of the seventeen-year-old population during that decade. Figure 9 demonstrates the effects of the large societal investment in higher education during the 1920's and the 1960's, and reflects the "catching up" which occurred after World War II. Figure 9 also reflects the periodic growth rates of educational attainment, and traces the effects of national policy and history since 1900.

FIGURE 9

% CHANGE OF DEGREES AWARDED EACH DECADE (1900-1980)



The model developed in Figures 8 and 9 can be expanded to include junior college outputs and can be used to examine and test alternative ways to raise the educational attainment of American youth. If a consensus can be reached concerning the relative value of decreasing the growth rate of one or more sectors and increasing the growth rate of one or more other sectors, the model can be run in reverse to determine the necessary numerical outputs of each degree level in order to meet a stated national objective for the educational enterprise. The political, economic, social and technological implications of determined objectives can be further distilled into a distribution of desired educational attainment in each of the several broad areas of study. To this end, we can utilize the recent relationship of doctorate output to baccalaureate degrees awarded several years earlier in each of the Office of Education broad study areas. Questions revolving about the distribution of educational attainment among males versus females, whites versus non-whites, domestic versus foreign students, etc., requires an in-depth historical analysis of these relationships over the period developed for this model. Only when all of these factors are considered can we predict with any degree of certainty the multi-faceted details of educational attainment to be expected from consciously selected alternative sets of national goals.

TABLE 4. CONVERSION OF PERCENT INCREASE PER DECADE TO ANNUAL COMPOUND RATE OF GROWTH

Percent Increase Per Decade	*Annual Compound Rate of Growth (Approximate)*
50	4.2
100	7.3
150	9.6
200	11.7
250	13.4
300	14.9

Within the resource constraints dictated by a set of national goals and priorities, and in the absence of something more than the current punitive mood of state and federal government toward higher education, it is clear that higher education cannot sustain the 12 percent growth rate of doctorate production which prevailed in the 1960's. Indeed, within the existing funding constraints, it is difficult at this time to imagine that higher education can sustain the long term six percent growth rate of doctorate production. If the nation were to revert to the emphasis upon educational attainment which prevailed in the 1930's and 1940's, then clearly we can expect that increased emphasis will be placed upon the baccalaureate level of educational attainment during the 1970's.

THE CONCLUSIONS

The size of the seventeen-year-old population is the only factor which can be established as an independent variable in future policy decisions regarding educational attainment. The numbers of these people receiving high school diplomas is asymptotically approaching 100 percent. The baccalaureate level of educational attainment has been established as a "gate." Below this level of educational attainment, the rapid expansion of the junior college system and the rapidly increasing enrollments in these institutions, coupled with the long-term trend toward educational attainment beyond the baccalaureate level, lead to a "bi-modal" distribution of educational attainment. The long-term trends are sensitive to cyclical deviations caused by wars, economic conditions, and changing relative emphasis upon national objectives.

A major problem facing higher education in general is a wide-spread lack of understanding in government of the growth problems being created by the extension of educational opportunities in both segments of the bimodal distribution of educational attainment. The following quotation from a Health, Education, and Welfare-sponsored panel (the Newman task force), which urges major overhaul of higher education, displays the naiveté with which the growth of the educational enterprise is considered:

> The task force said its study of access to higher education revealed, "A major phenomenon: The surprisingly large and growing number of students who voluntarily drop out of college." It said that it found that of the more than one million young people who enter college each year, fewer than half will complete two years of study and only about one-third will ever complete a four-year course of study. "College is failing to capture the attention and engage the enthusiasm of many students," the report states. "For some, it is a decidedly negative experience."

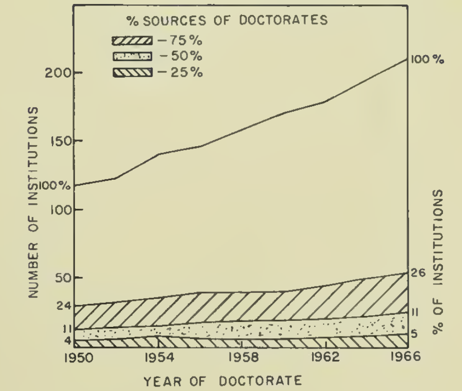
The passage condemns all of higher education because of a misinterpretation of statistics which may well indicate the initial success of the junior college system as a partner in higher education. The passage displays a clear misunderstanding of the developing role and function of the junior college system.

> "The main difficulty lies in the enormous range of student deficiencies to be overcome and the lack of adequate information about the motivational and learning patterns of disadvantaged students. . . . Another obstacle is the lack of wide-spread public understanding of the problems involved in training the type of students enrolled and the unwillingness of government at all levels to give adequate support to this effort. Effective remedial and developmental programs are expensive because they normally require a low student-faculty ratio."[8]

The junior colleges in a very short time seem to have achieved considerable success in raising the educational attainment of youth who elect to delay their entrance to the labor market by one or two years. However, a disparity exists between the aspirations created by the selling of the junior college system as a route to the baccalaureate and the achievement of those aspirations when they coincide with the attainment of the baccalaureate. One wonders what effect the large supply of seventeen-year-olds during the 1960's has had on the decision to delay entrance to the labor market. Chronic unemployment in the post-high school age group may well have induced this delay, but the 1970's will bring a leveling of this age group and the 1980's will witness a decline in their real numbers.

Whatever policies are pursued in the future, and whatever national goals and priorities evolve, it is important to recognize the existing comparative advantage among institutions of higher education and the need to establish a favorable division of labor in the delivery of their services. The need to specialize is emphasized in Figure 10, which demonstrates the high concentration of expensive advanced degree programs at a relatively small number of institutions. Just as the junior colleges are the intermediate but most often final level of formal educational attainment for a large proportion of our youth, the predominantly four-year institutions are the culmination of educational aspirations at the lower end of the age spec-

FIGURE 10. NUMBER OF U.S. INSTITUTIONS THAT GRANTED 25%, 50%, AND 75% OF ALL DOCTORATES, 1950-1966



Source: NRC, Office of Scientific Personnel, Doctorate Records File.

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trum for formal educational attainment, and certain universities can be described as the capstone at the other end of the bi-modal age distribution of educational attainment. But education is becoming increasingly recognized as a continuing experience for all age groups, and we can only speculate at this time on the effects that resultant changes in the lock-step model will have upon all of higher education.

Regardless of where relative emphasis is placed in the future, the established principle for the entire educational system must be a selective investment in quality: (a) improve the quality of educational attainment in the elementary and secondary school systems; (b) improve the quality and expand occupational preparation in the two-year colleges; (c) improve the quality of the programs at the baccalaureate level where institutional growth can and must be provided; (d) preserve advance degree programs of high quality where they presently exist.

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Inquiries to the Long-Range Planning Newsletter may be directed to Anthony F. Graziano, 107 Coble Hall, Champaign. Telephone 333-4493.

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Long-Range Planning

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VOL. 2, NO. 3, FEBRUARY, 1971

The New Depression in Higher Education

The Long Range Planning Committee has concluded that much, if not the major portion, of the funding for new programs, for innovation, and for change at the Urbana-Champaign campus must come by cutting back and/or abandoning existing programs. The Urbana-Champaign campus must begin to face the difficult task of planning by substitution rather than accretion. At present, all sources of financial support for higher education are decreasing rapidly. There is no indication that a reversal will occur in the next few years. A report by the Carnegie Commission on Higher Education describes the many facets of *"The New Depression in Higher Education."* The report has been condensed by the National Association of State Universities and Land-Grant Colleges and this condensation is being presented at this time in order that our faculty may gain some appreciation of the impending problems which face this campus.

NASULGC Condensation

The release of the Carnegie Commission on Higher Education's new study on college and university finance, particularly its listing of institutions "in financial difficulty" and "headed for trouble," received wide press coverage. News reports and editorials often had "scare" headlines and focused on the study's proclamation of an unprecedented financial crisis in higher education and its identification of specific institutions. Few media gave in-depth coverage to the study's findings on the response of colleges and universities to the financial crisis.

Since copies of the complete report, *The New Depression in Higher Education,* will not be generally available until McGraw-Hill publishes it in book form in February, we present here some of its important but so far relatively neglected aspects. Our focus is on portions of the study relating directly to public universities and on specific steps being taken in both public and private institutions to cope with financial pressures.

(Note: Quotations in this summary — as well as those used in other publications reporting on the study — are from the author's draft, "unedited for publication," as reproduced and made available to the press in December by the Carnegie Commission. The draft is subject to alteration in the final printed report. All emphases and underlinings added.)

A. STUDY SAMPLE AND METHOD

The study's author and director is Earl F. Cheit, professor of business administration and former executive vice chancellor of the University of California at Berkeley. The study was financed by the Ford Foundation and the Carnegie Commission.

The report is based on "on site" studies of 41 colleges and universities chosen as illustrative of the major types of higher education institutions (rather than as a statistically representative sample). The 23 private and 18 public institutions — including eight NASULGC universities — were grouped into six categories: national research universities, leading regional research universities, state and comprehensive colleges, liberal arts colleges, primarily black colleges, and two-year colleges. Four of the NASULGC universities — the *Universities of Texas at Austin, California at Berkeley, Michigan* and *Minnesota* — were classed as national research universities. The other four — *Ohio University* and the *Universities of North Carolina at Chapel Hill, Oregon,* and *Missouri at Columbia* — were classed as leading regional research universities. The state and comprehensive college category was made up primarily of AASCU-type institutions, while the liberal arts college category included only private colleges. Both public and private black colleges were included, while all of the two-year colleges are public.

For this study, detailed financial data were collected for each of the 41 schools. Between May and July of this year (1970), intensive interviews and visits of up to one day were conducted with campus officials on funding sources, uses, and prospects.

B. KEY DEFINITIONS BASED ON PROGRAM CUTS

Depending on their reactions at the time of the study to financial problems, and specifically on whether they have curtailed programs, the 41 institutions were each classed in one of three categories: "*in financial difficulty,*" "*headed for financial trouble,*" or "*not in trouble.*"

The categories, Cheit stresses, "are not based on and do not themselves reflect any judgments of the quality of the institutions' programs or administration. In any given case, a school could be in trouble precisely because it has good management which is making changes necessary to remedy financial problems." In some cases, he adds, "financially induced program changes may result in qualitative improvement."

An institution was considered in *financial difficulty* if its current financial condition forced upon it a loss of quality or a loss of services that it regarded as part of its program. An institution was considered *headed for financial trouble* if it had been able to meet current responsibilities without reducing quality, but either it could not assure that it could much longer meet current program and quality standards or it could not plan on support for evolving program growth.

An institution was considered *not in trouble* if it could meet current quality and program standards and could with some assurance plan the program growth it wanted.

"The more a school is doing to adjust its expenditures to its income, the more likely it is to be considered in difficulty," Cheit explained. "A school that does little will be considered 'headed for trouble' as long as its financing permits it to postpone serious readjustment. . . . On the other hand, a school which aggressively faces up to the need to make hard decisions, cutting dead wood and reallocating priorities, may for those reasons be classified here as in trouble. . . . There may be schools in our 'headed for trouble' category which under some different objective standard, say size of deficit and income prospects, are in worse shape than some of our 'in difficulty' schools."

The 41 institutions in the study were classed as shown in the following chart:

Financial Classification of 41 Selected U.S. Colleges and Universities

National Research Universities

Not in trouble	*Headed for trouble*	*In financial difficulty*
University of Texas, Austin	Harvard University	Stanford University
	University of Chicago	University of California, Berkeley
	University of Michigan	
	University of Minnesota	

Leading Regional Research Universities

Not in trouble	*Headed for trouble*	*In financial difficulty*
University of North Carolina, Chapel Hill	Ohio University	New York University
	Syracuse University	Saint Louis University
	University of Missouri, Columbia	Tulane University
	University of Oregon	

State and Comprehensive Colleges

Not in trouble	*Headed for trouble*	*In financial difficulty*
Saint Cloud College	Central Michigan University	Boston
	Portland State University	San Diego State College

Liberal Arts Colleges

Not in trouble	*Headed for trouble*	*In financial difficulty*
Hamilton College	Albion College	Beloit College
Meredith College	Allegheny College	
Mills College	Carleton College	
Whitman College	Cumberland College	
	Knox College	
	Pomona College	

Primarily Black Colleges

Not in trouble	*Headed for trouble*	*In financial difficulty*
Howard University		Fisk University
Morgan State College		Huston-Tillotson College
		Tougaloo College

Two-Year Colleges

Not in trouble	*Headed for trouble*	*In financial difficulty*
College of San Mateo	City Colleges of Chicago	
Flint Community Junior College	Mesa College	
Gulf Coast Junior College		

C. VARIATIONS BY CONTROL

Grouped by control, the 41 institutions would be classed as follows:

	Public	*Private*	*Total*
In Financial Difficulty	2	9	11
Headed for Trouble	9	9	18
Not in Trouble	7	5	12
	18	23	41

The total study sample is 44 percent public and 56 percent private. Of the institutions in financial difficulty, however, only 18 percent are public while 82 percent are private. Of the institutions not in trouble, 58 percent are public and 42 percent are private.

Noting that relatively more public institutions are "headed for trouble" and relatively more private institutions are "in financial difficulty," Cheit states that "although both public and private institutions are feeling financial stringency, it is affecting private institutions more severely." As a group, he says, the private research universities "are the hardest hit, but there are other types of institutions that are seriously affected. . . . By and large the private institutions are in a more difficult financial condition than the public ones because they have been in the cost-income squeeze for a longer time."

Cheit also notes that "although both types of institutions are facing economic adversity, there are also both private and public institutions still spared from its effects. . . . Public institutions have thus far had somewhat more success in avoiding economic difficulty than have private institutions, especially the large private institutions."

Cheit puts this finding in perspective by noting that "there are in fact some differences in the problems facing the two types of institutions, but there is no marked difference in the direction of their financial situation. It is deteriorating for both." He cites a forthcoming Association of American Colleges study which expected to show that one-fourth of all private colleges are drawing on endowment funds to meet their operating expenses. Public institutions, in contrast, cannot have financial deficits, he notes, adding the important explanation that *"while public institutions can show no budgetary deficits, their deficits are quality deficits and the consequences are no less severe for being hidden in diluted programs."*

In general, Cheit feels that "the public institutions have not yet been hurt as much as the private ones. Given the growth burdens they have been assigned, they have done remarkably well, with relatively low expenditures per student. *Their problem is to avoid being leveled by the new depression.*" Cheit found that "Administrators fear that good public institutions may be denied the resources to compete on quality terms with the best private schools. They seek more private money and a public commitment to quality."

The special problems faced by private institutions, Cheit states, relate to their "more fluctuating sources of support. Their growth has been undersupported. Given their greater expenditure per student, they have probably been forced more than have public institutions to use federal government funds to support their operating budgets," he claims. "If so, they are being especially hurt by the cutback in government funds."

(Alice Rivlin, in her report, "Toward a Long-Range Plan for Federal Financial Support for Higher Education," states that "it is the *public* institutions, rather than their private counterparts, which have experienced a *relative* decline in revenue per student in the recent past." Between 1959-60 and 1965-66, she points out, total revenue per student increased 4.0 percent annually at public institutions, but 8.1 percent at private ones. Per student revenue from tuition and fees alone increased 9.1 percent annually at the private institutions, but only 7.4 percent at the public ones. "Non-tuition sources of revenue in private institutions also grew rapidly," she reported. "In fact, revenues per student in private institutions would have grown at the same rate as public institutions, even if private institutions had not raised tuition at all." During these years, private institutions' share of total enrollment declined from 45 to 38 percent, but their share of total income declined only from 45 to 44 percent. She goes ahead to point out that the relative increase in private institutions' revenue per student cannot be accounted for by an increase in the higher-cost graduate programs, since the ratio of graduate students to total students increased slightly faster at the public institutions. Dr. Rivlin's study indicated that college and university per-student revenue would have to increase by 4.0 to 4.5 percent per year simply to stand still.)

D. ALL INSTITUTIONS ULTIMATELY MAY BE IN DIFFICULTY

Under his definitions, Cheit found "no class of institution . . . free from financial trouble." Even schools not in trouble at the time of the study were feeling financial pressures. Expenditures for these schools are declining and it is clear that they will not be immune if the gap between expenditures and income continues. In this sense, the financial problem is universal among the schools studied," Cheit says.

Cheit further suggests that the "headed for trouble" category, where few major differences are found among institutions, may be "typical" of higher education. "The conclusion is more strongly suggested by the high proportion of schools in the study found to be headed for trouble," he adds.

Becoming even more pessimistic, Cheit's concluding remarks envision the continued deterioration of the financial condition of higher education. "One thing all schools have in common is that they are likely to be 'in financial difficulty' if the present trends continue," he says. In the few months between the campus interviews and the study's release, for example, the financial condition of two of the sample institutions — the *College of San Mateo* and the *University of Michigan* — declined.

As further evidence, Cheit reported on a survey of the presidents of the members of the Association of American Universities, conducted at their October 1970 meeting. The presidents were asked to rate their schools according to the study's definitions. Of the 21 participating, the results were as follows:

October 1970 AAU Poll

	Not in Trouble	*Headed for Trouble*	*In Financial Difficulty*
Fall 1970	4 (19 percent)	12 (57 percent)	5 (24 percent)
Fall 1971 (Projected)	3 (14 percent)	9 (43 percent)	9 (43 percent)

E. CHARACTERISTICS OF SCHOOLS IN FINANCIAL DIFFICULTY

The 11 institutions considered in financial difficulty shared several characteristics. First, none of the two-year institutions and a relatively small percentage of the comprehensive or highly selective liberal arts colleges in the study are in this group. Relatively more regional but relatively fewer national universities were in financial difficulty.

Second, among the institutions in financial difficulty, "a heavily disproportionate number of private institutions" were included. (See Section C of this summary for details.) The predominantly black colleges in financial difficulty are all private and small.

Third, all but two of the institutions are in urban locations. Eighty-two percent of the institutions in difficulty but only 54 percent of all study institutions are located in metropolitan areas.

Fourth, the institutions in financial difficulty have high student aid costs.

Fifth, in general, faculty salaries at these institutions are higher than at institutions not in trouble, but lower than at institutions headed for trouble.

F. CONDITIONS AT INSTITUTIONS NOT IN TROUBLE

Cheit identified several factors which, he said, provide "clues for an explanation of why some schools are 'not in trouble.' " On the expenditure side, the not-in-trouble schools spent less on student aid than other institutions. They also spent relatively less of their educational and general funds on faculty salaries and academic departments while spending relatively more on supporting activities.

On the income side, four differences were noted. First, at schools not in trouble the rates of growth of income from private and federal sources and from endowment — although declining — were declining less than at other schools. Second, reliance on income from the federal government as a share of institutional income grew less rapidly in the 60's at the not-in-trouble schools. Third, endowment income at these schools accounts for a relatively larger share of total income than at other schools. And fourth, there has been less rise in tuition as an income source at not-in-trouble schools.

"Together, these differences add up to a 'not in trouble' balance sheet," Cheit states. The differences, however, are not self-explanatory, "but obviously the result of other conditions." The study goes on to list ten factors that stood out from interviews and financial data and "seem to apply favorably to all not-in-trouble schools and unfavorably to others." In listing the factors, which vary in importance for each institution, Cheit cautions that the study is "not suggesting what any schools ought to be doing, in finance or in program." The factors follow:

1. The not-in-trouble schools are less affected by campus disturbances and resulting adverse income and expenditures. Basically, freedom from campus disturbances has helped them obtain private gifts, keep legislative funds coming for reasonable budget requests, and avoid high security, insurance, and related costs.
2. The schools have a "good fit" between student and faculty aspirations and programs.
3. There is high community regard for the institutions' activities — strong public confidence.
4. The not-in-trouble schools have smaller student aid expenditures than the others.
5. While their program goals are limited and their rate of program growth more controlled, enrollment growth has been relatively rapid.
6. The schools have lower average faculty compensation, ranking one-half AAUP grade below other institutions.
7. They have a higher rating of institutional efficiency — i.e. more management resources to deal with problems, relatively greater expenditures on administration and staff support.
8. They have been less affected by reduced federal support of higher education.
9. They have "room for financial growth" and are confident about tuition and gifts as additional income sources. In recent years, these schools have had a small decline in the percentage of current-fund income received from tuition and fees. They are operating or opening development offices and starting fund-raising campaigns.
10. Some, such as the University of Texas with its oil-land endowment, have benefitted from "luck and circumstance," including a favorable location. Most of the institutions not in trouble are in the non-metropolitan north or in the south "where they may be shielded from some of the current pressures of social conflict . . . that may one time have adverse effects on a school's income and costs."

G. MEDICAL SCHOOLS AS A FACTOR IN FINANCIAL PROBLEMS

A special section of the report dealing with the role of medical schools concluded that they are "not invariably an important factor X" in the financial problems of universities. Of the 41 institutions, 13 — divided among all the financial categories — have medical schools. Where the medical school was considered an important factor in the university's financial problems, the parent institution was often found working to make it financially independent.

Three medical schools are at institutions not in trouble: Texas, North Carolina, and Howard. Texas and UNC reported that their medical schools were not a significant cost factor — Texas' because it gets a separate appropriation, and North Carolina's because clinic income helps finance expansion. Howard, in contrast, said its medical school is the most expensive unit on campus and a cost factor of some concern.

The four medical schools at universities considered in difficulty, however, are each "significant financial factors." Stanford and St. Louis University in fact said that they are cutting back as much support as possible from their medical schools. Tulane and NYU also reported their medical schools to be major financial drains.

The remaining six medical schools are at universities headed for trouble. Two — Michigan and Missouri — feel the medical school is a significant cost factor to the campus; whereas the University of Missouri's medical school at Columbia was said not to be a serious financial problem although there was concern about a financial drain from a new medical school in Kansas City. Special financial burdens were not identified from the other three medical schools in this group.

H. ELEMENTS OF THE FINANCIAL PROBLEM FACING HIGHER EDUCATION

The study characterizes the financial problem facing higher education as a cost-income squeeze. "The essence of the problem is that costs and income are both rising, but costs are rising at a steady or a slowly growing rate, depending on the period and the measure used, whereas income is growing at a declining rate."

The main consequences of this gap between costs and income began to appear in 1967-68, right after a period of unprecedented expansion in higher education. Their growth, Cheit says, made many schools more vulnerable to the downturn, as they were "undercapitalized, overextended, moving into enlarged areas of responsibility without permanent financing, or still raising quality standards." Because the increasing demands on higher education institutions "are an important part of the reason for cost increases, the cost-income problem is far more than the consequence of inflation, overextension, and an external economic downturn," Cheit says.

From the interviews, five factors accounting for "the historical rise in costs" were identified. The factors, with their estimated "percentage point shares of the cost growth" from 1966 to 1969 are as follows:

1. Effects of inflation	2.4 percent
2. Rising faculty salaries	2.0 percent
3. Rising student aid	.9 to 1.7 percent
4. Cost of campus disturbances; theft and destruction of property	.3 to 1.0 percent
5. Growth in responsibilities, activities, and aspirations (including need for equipment, costs of new programs, per-student cost increases)	1.5 to 3.5 percent

Colleges and universities cannot cut costs equally effectively in all of these areas. They have no control over inflation, for example, and only partial control over faculty salaries (which are affected by inflation) and disturbances. They could, if necessary, have greater control over student aid and "the residual amount assigned to growth in programs, activities, and aspirations," Cheit notes.

Looking at current sources of income, the study sees continued growth but at a declining rate, particularly in federal and private support and endowment. State appropriations have generally continued at their past rate of increase, but a legislative backlash has already been felt in some areas and is expected in others, the study notes. Tuition has been increasing rapidly — at 7.5 percent a year — but many institutions — public and private — fear it has reached a "saturation point," threatening to bar low-income students and to "put some private schools in a poor competitive position."

The study includes many specific examples to document the cost, income problem it describes. Running through public university data are recurring reports of public hostility; legislative backlash; private giving drop-offs, especially from industry; rising costs and growing needs for expensive new equipment and programs; the pinch of federal cutbacks; and concern about aid for low-income students. Here are some of the financial pressures reported by the research universities:

— *Ohio University* cited a poor climate for obtaining additional funds, noting that protests were a factor. It also noted increases in insurance rates, declines in federal support, and stated "fees are as high as they can go." Deferred maintenance and negotiations with campus unions also imposed burdens.

— *The University of Michigan* reported a "dismal" outlook, encompassing a lack of capital funds; declines in federal support for science; and an expected appropriations backlash stemming from unrest. In addition, Michigan cited problems in meeting its increased commitment to low-income students in light of its need to charge higher fees to increase income.

— *The University of Minnesota* cited severe federal cutbacks, competition for state funds, especially from junior colleges; costly pollution efforts; rising computer costs; inadequate student aid for the disadvantaged; and an expected backlash to unrest. In addition, Minnesota feared a loss of public confidence, the impact of economic decline on gifts and endowments, and repercussions from reapportionment (urban legislators had been introducing punitive bills).

— *The University of Missouri* reported defeat at the polls of a state tax increase; higher than average fees; almost no construction funds despite a space shortage; a bleak legislative outlook; public support for retaliation against the University; competition for state funds from public service needs. A tuition increase was the only way to raise salaries this year.

—*The University of Oregon* reported facing cuts recommended by a consulting firm and feeling the impact of declining federal funds. It needs expansion funds, especially for the library and administration. The University was adversely affected by declines in the state's lumber industry, also.

To further illustrate increased costs, the study included the following estimate of the impact of campus disturbances on an institutional budget:

Estimated Costs of Campus Disturbances as a Percent of all Expenditures for Educational and General Purposes, One Institution, 1969-70

1. Security	.890
2. Insurance	.275
3. Property replacement and repair	.414
4. Additions to staff	.192
5. Diversion of existing staff time (includes loss of time due to closing buildings)	2.953
6. Costs of disciplinary hearings, administration of regulations, not otherwise accounted for above	.022
Total	4.746

Note: The above figures are based on actual cost estimates prepared by the staff of an institution for this study. The figures provided us were dollar amounts in each case. We have converted them to percentage of educational and general expenditures.

I. INSTITUTIONAL INCOME NEEDS AND PROJECTIONS

Looking ahead, the study projects that income for higher education institutions cannot be expected to grow near enough to meet budget "costs under a determined policy of prudence," but rather will increase only enough to keep many schools on "budgets approaching 'rock bottom' which allow for substantially no growth at all in several major cost components." Cheit estimates that income must grow at the rate of 6.4 percent per student per year for any school to "break even" at the present level of inflation — and this assumes some cut in the cost increase areas where universities have control. If inflation is controlled, "a policy of prudence would require an annual increase of just over five percent," he says. For what he calls the "stringent, rock bottom, and improbable (except for short periods of time)" budget, a 2.2 percent budget increase per student per year would be needed to keep institutions operating. This figure becomes 3.4 percent if inflation continues at recent rates. The following chart shows the figures going into these projections and estimates:

Estimates of Annual Percentage Increase in Current Fund Expenditures, Per Student, Needed for Operations

Cost factor	*Extent of campus control*	*Projection from 1966-67 to 1969-70 levels, assuming actual or high costs*	*Early 1970's policy of minimum growth, assuming low costs*	*Early 1970's rock bottom policy, assuming maximum control and low costs*
Inflation	None	2.4	1.2	1.2
Faculty salaries	Partial	2.0	1.3	.7
Disturbances and security	Partial	1.0	.3	.1
Student aid	Substantial	1.7	.9	.1
Responsibility, activities, and aspiration	Substantial	3.5	1.5	.1
		10.6	5.2[a]	2.2[b]

[a] 6.4 minimum if inflation continues at 1966-67 to 1969-70 rates.
[b] 3.4 minimum if inflation continues at 1966-67 to 1969-70 rates.

Focusing on institutions in financial difficulty and on immediate past experience, the study projects income growth figures for hypothetical, "hybrid" public and private institutions, noting that the projection could "be adjusted for different, actual institutions in the light of how their income components differ from those hypothesized." Although the hybrid institutions follow the income patterns of schools in difficulty, the study warns "there is every reason to believe that a similar range of minimum deficit applies to the headed-for-trouble schools and even to the not-in-trouble schools if present trends continue for long.

Income Growth Projections for Hypothetical Institutions

	Hybrid Private Institution	*Hybrid Public Institution*
Tuition	2.6	.8
Federal government	.6	.5
Gifts and grants	1.2	.2
Endowment income	.2	.1
Other	.2	.2
State government	—	2.6
TOTAL	4.8	4.4

As seen in the chart above, the projected rates of growth are under five percent per student per year, even though minimum expenditure growth at the current rates of inflation are projected at 6.4 percent per student per year. "This would leave a range of minimum deficit between

1.6 and 2.0 percent of total operating fund per student per year," the study says. The schools, then, would have to operate closer to the rock bottom basis in order to begin to break even again. And, in fact, information for the current 1970-71 year, according to Cheit, indicates that "income is beginning to force operations toward rock bottom." Several schools, he says, predicted that next year their income growth will be no more than two or three percent. "Thus the immediate future for many schools is one of operating on a survival budget or increasing the gap between income and expenditures, an increasing aggravation of the cost income problem," . . . Cheit warns. . . . "The schools must find more money, or make cuts, or do both. These are the financial facts facing most college and university administrators."

J. HOW INSTITUTIONS RESPOND TO FINANCIAL DIFFICULTY

In line with the study's key definitions, program and budget cuts varied with the financial classification of an institution. At those considered not in trouble, no program cuts are underway or planned. The other institutions, however, are making program cuts in response to their financial problems.

"Like anyone reacting to adversity, the academic administrators first hope is that the new situation is temporary and painful cuts into operations, program, and quality can be postponed," Cheit states. "They turn naturally to the adjustments that cause the least personal hardship and the least interference with essential academic activities." The first response, therefore, is often to decline new obligations and to scale down or cancel plans for new activities, particularly leaving unfilled positions for which recruiting has not started. Next come reductions in services not central to the academic program "and a deterioration in standards applied to the current program." Finally, according to Cheit, there come the cuts in the academic program itself. There may be an increase in charges or enrollment, too, as schools try to grow rather than cut their way out of trouble.

The institutions headed for trouble have therefore made a limited response. They have started postponing planned program growth and are making some efforts to cut academic costs to permit reallocations from one activity to another — mainly by not filling staff vacancies or by cutting marginal academic programs. "There is very little evidence that the schools headed for trouble are cutting out academic programs other than summer schools or making important reallocations that in effect change academic structure," Cheit said.

In contrast, the schools in financial difficulty, "have, by and large, gone more deeply into that phase of cost cutting and some have begun to drop departments and majors." These changes in structure, however, "still occur only at a minority of schools," Cheit states. "The other responses are generally of the belt-tightening variety." They are likely to start with cuts in maintenance; continue with cuts in expenditures for supplies, equipment and travel; and then include fund cuts for experimental programs and extra-curricular activities and events. The pressure is great enough to reduce funds available for student aid and special admissions at in-difficulty schools. Reductions are also likely to be made in campus communications budgets, cultural activities, and certain kinds of student services. There are also typically cuts in the number of non-academic employees.

Regardless of program cuts and postponements, Cheit found that nearly all schools in nearly all categories have been intensifying their efforts to seek more funds. Those without development offices, for example, are starting them.

Cheit also found more planning than ever before underway at all institutions, "with money as the key variable." And finally, he found a "universal response of worrying," for, as he noted, "the trends for most schools, are not good."

K. RESPONSES AT INSTITUTIONS HEADED FOR TROUBLE

The institutions headed for trouble, Cheit reports, are meeting their current program commitments without reducing quality; but all have made some cuts. "Not surprisingly," Cheit says, they have been making "an intermediate level of response to financial situations that are still at an intermediate level of severity." In particular, they have cut the rate of increase in expenditures, particularly for budgeted departmental instruction and research, for sponsored research, and for student aid. (The latter has been cut from 18.1 percent a year between 1959-60 and 1969-70 to 3.6 percent a year.) The rate of growth of their income is declining and some have started spending reserves or endowment funds. There is "no indication from the interviews that modern technology as applied to instruction and libraries is an important source of savings," Cheit said.

"Although many administrators recognize the real possibilities of severe crises ahead, it seems fair to say that (their) strategies do not yet reflect a response to either the underlying causes of the financial depression in higher education or a re-examination of the schools' missions or long-run prospects, nor do they propose to work major changes in the schools' structure or character," Cheit said.

Cheit grouped the active responses institutions headed for trouble are taking to control their financial situation into five major categories: (1) postponing, (2) belt-tightening, (3) cutting and reallocating within the existing structure, (4) scrambling for new funds, and (5) planning and worrying. The first three, in particular reflect a reining in of the area where schools can exercise the greatest control over their expenditures — the growth in responsibilities, activities, and aspirations.

1. *Postponement.* New program growth is one of the first casualties in institutions headed for trouble because there is no new money available to finance them. The commitment, criteria, and/or administrative authority to cancel existing courses, trim back existing programs, lay off faculty, or increase the student-faculty ratio to find funds to start new programs generally does not exist, the study found. Initially, new obligations not already in the planning stage are declined. Capital outlays are postponed if only partial outside funding is available.

   Nearly all of the schools headed for trouble have postponed some academic programs plans. All disciplines have been affected — from Asian and Black studies to engineering. Several schools also have the policy — and others are considering it — of "making no capital expenditure unless fully funded and accepting no new program that is only partially funded." Where construction has been started, institutions have proceeded amid resulting doubts as to the gravity of their financial problems. Most institutions headed for trouble have also postponed maintenance, landscaping, minor capital improvements, needed land purchases; and hoped-for administrative staff additions.

2. "General *belt-tightening*" has been done "to preserve funds for instruction by reducing expenses such as supplies and equipment." Cuts here have not generally been large or central enough to change academic structure or format. The study identified eight types of belt-tightening and listed them in the order in which they are likely to occur:

   a. Cutting maintenance. Such cuts are impersonal and result in no specific felt harm. Their danger is that in the long run they lead to greater expenses than they eliminate. One school, for example, reported it no longer washes windows.

   b. Trimming expenditures for supplies, travel, laboratory and other equipment.

   c. Cutting funds for experimental programs. "It is clear that innovation suffers and suffers early," Cheit states.

   d. Reducing extra-curricular activities and events. The possibilities are limited here because such items are often student funded out of special fees. Also, some activities — football, for example — may actually produce income.

   e. Cutting student aid and special admissions, often with new limits on eligibility. Low-income and out-of-state students are the main victims.

   f. Eliminating selected communications, cultural, and student services. Most likely to be affected are the publications budget, lectures and concerts, public information services, health services, and library hours.

   g. Freezing the hiring of nonacademic employees.

   h. Cutting salaries. One institution reported that its top administrators took a voluntary ten percent salary cut. Strong pressures — particularly from inflation — for salary increases, however, make such cuts most difficult and in fact make even small increases seem like cuts.

3. *Cuts and reallocations within the existing structure* have not been painless, Cheit notes, but have generally involved "marginal" rather than major moves, leaving the basic school, departmental, and program structure unchanged. Several types of actions in this area were identified:

   a. Moving money between academic departments by attrition, increasing enrollment where students are an asset, reducing enrollment where they are a liability. This includes cutting graduate enrollments that are too costly and freezing staff replacements to allow the re-evaluation of resource use in departments.

   b. Cutting academic programs, such as centers or institutes, whose priority ranking comes primarily from outside the university. As an example, Central Michigan University dropped its lab school, but created community ill-will, the report noted. In another effort, Ohio University's efforts to drop flight instruction met with opposition from state legislators.

   c. Cutting for reallocation in academic departments, an approach not yet used often. Summer instruction is an early target when not self-supporting. Selected courses and nontenured faculty positions follow. The impacts of such cuts are generally not serious except in experimental programs.

4. *Scrambling for new funds* refers to attempts to increase income. Nearly all of the headed-for-trouble institutions are intensifying their efforts to raise private funds, Cheit reported. Several have revised their investment policies and anticipate improved returns. Most were also considering tuition hikes. Some also were hoping for "outside funding," including "more state money to engage in private business ventures to produce added income."

5. Regarding *planning,* Cheit cited "efforts at a more controlled and sophisticated management . . . designed to prevent the acceleration of financial difficulty from headed for trouble to in financial difficulty." He noted that "planning with a shortage of funds as a constant" was relatively new to many. Administrators who previously would have presided over physical and program expansion now must think of "growth by substitution, adding only by reallocation." Programs are not approved without definite funding.

Planning mechanisms are changing too. Financial stringency has brought more centralized decision making on budgets, control, and priorities, along with a greater interest in budget review and advice. Many campuses have new budget review or resource committees. At 40 percent of the institutions headed for trouble administrators, faculty, students and trustees are being invited to serve on broadly based committees "to provide input on the impact of finance upon the academic life of the institution."

The effect of all these strategies is to slow down the rate of expenditure growth and to relieve some pressures at the schools headed for trouble. They will not — nor do administrators believe they will — solve the problems, Cheit states. Officials "have little faith that the situation can affirmatively improve without changes in major external conditions — the economy, federal policies. . . . In short, the administrators believe things are likely to get worse at their schools for the next several years or even the next decade," Cheit found.

In light of this pessimism, Cheit questioned why the officials aren't taking "more fundamental steps" to cut growth. The reasons he found are discussed in section N of this summary — "Are Administrators Doing Enough?"

L. RESPONSES AT INSTITUTIONS IN FINANCIAL DIFFICULTY

For the institutions in financial difficulty, cost-cutting "has been a fact of life for some time," and they have gone "well beyond postponing and general belt-tightening measures" that characterize the schools headed for trouble. Cheit cited six characteristics the schools in financial difficulty share regarding their financial condition and their response to it:

1. The private institutions in financial difficulty are operating on deficit financing, with deficits running from 1.6 percent to 20.5 percent of their budgets. The public institutions are on "stand still" budgets.
2. All are reducing the number of faculty positions through cutbacks, a freeze on unapproved hiring, or both. They are also reducing their teaching and research assistants.
3. They are holding enrollment stable or growing, increasing their student/faculty ratios.
4. They are making cuts in instructional programs, making reductions of courses, graduate programs, and entire professional schools.
5. They are reducing the number of administrative positions or not adding needed new ones.
6. The research universities are reducing the budgets of their research centers, institutes, and related activities considered important parts of their academic program. Other institutions, and some research universities, are reducing programs considered important parts of campus intellectual life.

The report included the following chart to illustrate the great cost pressures on schools in financial difficulty. The chart shows the dramatic slowdown in educational and general expenditures at these institutions:

Average Annual Rate of Expenditure Increase Per Student, at Schools "In Financial Difficulty"

	Educational and general	*Educational and general less sponsored research*	*Instruction and departmental research*	*Student aid*
1959-60 to 1969-70	9.5%	9.0%	8.0%	21.5%
1969-70 to 1970-71[a]	−.7%	3.6%	3.0%	−.9%

[a] Figures for 1969-70 to 1970-71 based on data from four institutions, the total number of "in trouble" schools with figures available at the time of the study.

Some of the institutions in financial difficulty are working on plans designed to balance their budgets and produce funds for flexibility and growth. Noting that the designation of an institution as in financial difficulty is not a reflection on its administration, the study contained many examples of the drastic consequences of the cost-income problem at the schools in financial difficulty. A few of the details follow:

— At the *University of California at Berkeley,* one of the two public institutions considered in financial difficulty, no capital funds are available and no faculty salary increase was given this year. Two research institutes — earthquake engineering and social science — were eliminated; while others, including an institute on race and community relations, did not receive their planned budget. The summer quarter, with 208 faculty positions needed for year-round campus operation, was eliminated, and summer instruction must now be self-supporting. Graduate students, teaching assistants, and administrative posts have been reduced, while the student/faculty ratio has been increased. Many new courses and medical school development plans have been postponed, while cuts have been made in community service and various research programs. Courses cut included various freshman seminars.

— At *San Diego State College,* the other public institution in financial difficulty, 48 faculty positions were reported unfilled and other research positions eliminated. Class size is up. Sabbaticals have been cut in half and the equipment budget was cut.

— Among private institutions, *St. Louis University* has closed its school of Dentistry and four engineering departments. It has eliminated 45 faculty positions and given 40 permanent faculty two-year notice of severance.

— *Beloit University* eliminated its summer theater, cut back student research, and postponed planned American studies and undergraduate tutorial programs.

— *Boston College* postponed a library building, cut back dormitory plans, stopped faculty growth, and reduced special admissions.

— *Fisk College,* a predominantly Black institution, plans to phase out its Afro-American Institute and to freeze the number of faculty for three years. It is drawing on its endowment, which it expects to exhaust in three to four years.

— *Tougaloo College,* another predominantly Black college, eliminated its membership in intercollegiate organizations and was reported in arrears on current bills.

— *New York University* has been forced to sell its non-educational business assets to raise income and to borrow to cover its deficit. NYU has frozen the number of faculty and reduced the number of teaching assistants it uses.

— *Stanford University* reported eliminating 21 faculty positions, including ten history instructors, five science, five drama, and one Italian teacher. It has cut its library acquisitions and scrapped plans to expand its library and law school. It also scrapped its drama program and field trips for overseas programs. Stanford has reallocated general funds from its Hoover Institution and Business School. New programs in urban and environmental studies were not funded.

— Finally, *Tulane University* eliminated its Ph.D. programs in classics, Italian, geology, music, theater, and social work. It also eliminated its laundry and printing press.

M. ADMINISTRATORS' VIEWS ON POLICY SOLUTIONS

A final aspect of the Carnegie report which has been relatively overlooked in press accounts is its reporting of the views of administrators at the study institutions. One chapter of the study is devoted to summarizing these views, dividing the administrators according to the type of institution they head.

Perhaps of greatest interest and irony in light of the emphasis in the Carnegie Commission's first report on aid to students is the strong endorsement reported for institutional grants from the federal government, particularly by administrators of junior colleges, universities, and other doctoral granting institutions. Regarding university administrators, Cheit noted that "*on the campuses visited in this study, there is strong support for federal assistance in the form of unrestricted institutional grants.* The rationale is that the funds would be better used than they are under restrictive provisions. The problem is not fear of federal control of education, but rather that money is not being used as effectively as it could be with more campus freedom to allocate it. Officials do not want the evolution to programs to be dictated by opportunity money that might distort the order of campus priorities. . . ."

"Administrators admit that the problem is, in all fairness, one for the campus more than for the government," Cheit continues, "but given the universities' rather limited control and planning systems, administrators seem to be saying that their job of managing resources would be easier and the public's money better used, in fact, if the government had a policy of unrestricted grants to institutions."

Reflecting their heavy reliance on federal funding, a main concern of university officials was an increase in federal aid. In addition to institutional support, they felt that if federal aid is tied to programs it should be used for the construction or support, probably on a regional basis, of specialized, expensive facilities such as computer centers or medical schools. The administrators were interested in cooperation among neighboring institutions to avoid duplication.

The report noted that *for the private universities as a group, "federal funds represent the largest single source of operating income"* — 33 percent of budgets, followed by tuition at 31.5 percent. (State universities in the study received 27 percent of their operating income from the federal government, with state sources providing 43.5 percent.)

All university administrators also stressed the urgent need for increased student aid — from both federal and state governments.

Both public and private university officials looked to greater state support too. They particularly felt states should better exploit available revenue sources to help ease the financial problems of higher education.

Regarding private university interest in the states as a source of increased revenue, Cheit reported concern in private institutions that they will eventually have to turn public if their states don't help them. (Three of the study's 23 private institutions, in fact, are reported to be involved in confidential discussions of merger into their state systems. The schools were not identified.)

"The ironies of this situation are lost on no one," Cheit adds. "As the administrators of these schools see it, the issue is how they can obtain state aid without giving up their independence from the control and fiscal intervention that seem to go with state support of state institutions. The answers offered are either outright, unrestricted grants; payment for service, based for instance on number of graduates; or payment for major service programs such as hospital services." Several administrators feel service program payments will in a few years become the most important state source of income for their schools.

University administrators are also trying to raise additional private funds, particularly from alumni and business corporations. Cheit feels that such income will not be major.

Another concern was improvement of internal operations. "At substantially every campus there is at least some form or partial or pilot review of operations, or plans for a review of operations, designed to improve efficiency through new means of internal approval of expenditures, new methods of measuring output, control over course proliferation, and devices for internal reallocation of funds," Cheit said. Most of the universities, however, are handicapped, he noted, by administrative staff shortages and a lack of "management and analytical capability."

Liberal arts college administrators include competition from state institutions among the reasons why they feel private education is in a crisis. As Cheit puts it, "Administrators of the liberal arts colleges are struggling with the cost-income squeeze in a context that raises a larger issue. Their institutions offer an educational program that was once unique. Today, however, state institutions offer much the same program, often just as good qualitatively, and at much lower cost to the student. Not only does this pose a problem of financial competition, but it also raises the larger question of the role of the liberal arts college."

The liberal arts college officials "argue persuasively the case for diversity, for pluralism, and see the solution to their problem in gaining access to more federal and state funding while retaining their independence," Cheit reports. They overwhelmingly favor subsidy to their schools "in the form of per student grants. . . . All agreed that the subsidy should be paid directly to the student (*who presumably would pay it over to the school in the form of increased tuition*) rather than to the institution."

Many of the liberal arts colleges are concerned about extinction. The small Black colleges in particular fear someone else's criteria of size, efficiency or quality might be imposed on them. Other schools fear increasing difficulty in competing with public colleges "unless they are permitted to remain in operation through public policies explicitly designed for that purpose."

Regarding federal and state funds, the junior college presidents want more unrestricted grants "to enable college decisions to better reflect institutional priorities," Cheit reported. The administrators also preferred channelling federal aid through the states, rather than direct, because, Cheit suggests, their strong local ties could more effectively influence decisions on the money's use. "Presumably this policy would help relieve the financial situation of the two-year institutions because of a greater *willingness of the states to use federal money to support them in competition with other types of state colleges.*"

The junior colleges also want revisions in the allocations of funds to give them a *higher priority relative to "state institutions with more academic prestige,"* Cheit reported. The junior college administrators are also concerned about increased efficiency, an improved image, fund-raising from their alumni, and better use of state and local tax sources.

State and comprehensive colleges, according to Cheit, "occupy a somewhat ambiguous position between the universities on the one hand and the liberal arts colleges on the other. . . . For them, the main problem seems to be one of working out their roles within the state's educational plan. These interviews reveal financial pressure, but not a sense of crisis. The impression gained . . . is that once the mission for these institutions is firmly defined, the financing problems can be solved." Administrators of these colleges, however, expressed frustration with excessive budgetary controls, red tape, and inflexibility.

Generalizing about all administrators, Cheit notes that they feel alone and worried. "One of the most overriding impressions gained from this study is that most college and university officials believed that their view of the financial troubles is generally not shared by others off campus or on." Administrators feel that their trustees have a generally good picture of the problems. Less than half the officials, however, feel that their faculty have a good understanding, and no administrator believes that the general public shares his view of the financial conditions, Cheit reported.

Looking ahead, college and university officials are worried about three major problem areas: (1) their ability to make painful decisions needed to make campus readjustments to new financial realities; (2) their schools' ability to cope with not only the new array of economic forces affecting educational finance but also with new political and public hostility towards education; and (3) the unprecedented gravity of current financial problems.

N. ARE ADMINISTRATORS DOING ENOUGH?

Noting that "what does not come through to the visitor to the campuses is a sense that the institutions are deeply involved in establishing a set of priorities, or that they have the administrative direction or authority to reallocate money promptly in accordance with their priorities," Cheit raises the questions of whether administrators, particularly at schools in financial difficulty or headed for it, are doing all they can to make adjustments to their new financial situation. At present, he concludes, they are partially unwilling and partially unable to take stronger action than they have.

Administrators are often unwilling to "take actions which would give solid credibility" to the severity of the crisis, he notes, because of "an apparent need to keep up appearances and to continue even in the face of difficulty to

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operate as if nothing has happened." Officials believe donors will shy away from institutions in trouble. As a result, the public believes that the institution may be squeezed a bit, but basically secure.

Cheit lists several "barriers" to changes in campus structure that would significantly reallocate resources. One set of barriers lie in the policies and traditions ruling out faculty firings, he says. Faculty tenure he calls "a bar to flexibility." The academic tradition rules out laying off faculty, he adds, noting that faculty layoffs are damaging to morale and considered only an "absolute last resort."

In another area, many administrators do not feel there is machinery, support, or credibility on campus for major decisions requiring sharp cuts. Since colleges have historically changed by growing rather than cutting, most lack the decision-making apparatus to make and implement new priority decisions. "Therefore," Cheit concludes, "substantial reductions of changes that involve basic assumptions about the institution and its major programs are not made until they can no longer be avoided. The issue of teaching loads will not come up until forced by very serious economic circumstances.

A lack of support on campus also helps explain the surprising finding that administrators at only four of the 41 schools said that their money situation had provided a chance to "get rid of dead wood." Other reasons were that "most institutions are still in the process of deciding what wood is in fact dead," that some institutions "have been in difficulty long enough to have taken whatever organizational advantages there are in financial adversity," and that administrators "do not either have or use the organizational authority to make the kinds of reallocations they would like."

Still another explanation for a lack of more decisive action now is that some administrators believe the financial crisis will end in a few years. "They believe that a combination of price, labor-market, and funding-policy changes will improve their situation. They are planning a period of several years of difficulty and believe they should avoid retrenchments designed for a longer run." Still other administrators who are less optimistic about the duration of this depression may hesitate to move quickly, "believing that ground lost this way is difficult to recover." Since colleges and universities often built quality by taking risks and expansion, "what might look like a failure to adjust to depressing conditions might with hindsight be visionary," Cheit explains.

Regarding public institutions, Cheit quotes extensively from a memo submitted by an unnamed budget officer to illustrate the special complexities and the rigidities "that a public institution faces in making definitive readjustments in the allocation of resources."

O. STEPS NEEDED TO RESTORE CONFIDENCE AND FINANCIAL STABILITY

In his concluding remarks Cheit comments as a "critical outsider" on what must be done to restore financial stability to higher education. "Recovery will not be the by-product of other events and other policies," he states. "It requires the deliberate application of major policies by the schools and the public, directed to the future of higher education."

Noting that all of the administrators felt that the public is no longer highly motivated to increase its investment in higher education and that college presidents "invariably speak of the need to restore public confidence in higher education," Cheit outlined three aspects of this task:

1. "The colleges and universities must have campuses that reveal themselves as being reasonably governable," i.e., stable campuses with discernible evidence of administrative direction.
2. The institutions must demonstrate that they are reasonably efficient in their internal operations, that money they receive will be put to efficient use. "Colleges and universities ought to know what their functions cost, what their purposes are, and whether by some reasonable standard they are spending their money efficiently." Many campuses "are working to develop that knowledge," Cheit states. Noting the danger that criteria developed to measure the effectiveness of educational expenditures will ignore quality as a central component in performance, Cheit states that "interest in efficiency and productivity can be well-motivated."
3. Convincing evidence is needed that the activities of colleges and universities have a unifying set of purposes "that the supporting public can understand and defer to." It is not surprising that the public doubts the schools' sense of priorities or mission when so many students and faculty find "little sense of purpose on a campus engaged in a web of service, research, instructional, and specialized community roles," Cheit says. "Until there is more agreement about purpose there will be less interest in financing," he warns.

Finally, Cheit states that university efforts alone will not restore financial stability; government has a role to play too. "Major new public policies directed toward the cost-income squeeze and reflecting the varying missions and utilities of the different types of institutions" are needed, he says.

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Long-Range Planning

FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

VOL. 2, NO. 2, NOVEMBER, 1970

University's Development Plan

The 1970-71 efforts directed at long-range planning for the University of Illinois have culminated in a development plan which is presented in part in this report. It has been decided to give the University's document the title "Provisional Development Plan," with the understanding that it will have careful study during the year and will be published in final form in June, 1971. This will allow time for all major constituencies of the University — faculty, students, administrative officers, alumni, trustees — to contribute to the revision. With this objective, the Long-Range Planning Committee for the Urbana-Champaign campus is publishing a synopsis of the overview of the University's Development Plan and the complete section of the Provisional Development Plan which discusses the future of this campus. Each department head has been provided with a complete copy of the Provisional Development Plan for 1971-72 through 1980-81, and you are urged to refer to it and to forward your comments to the Committee.

Overview of the University's Development Plan

THE ENROLLMENT OUTLOOK FOR HIGHER EDUCATION

The following are the principal conclusions from the data and analyses presented in the first chapter of the report:

1. College-age population in the nation and in Illinois will rise steadily during the next ten years, to a high point in 1980 (increases of 20 and 26 per cent, respectively, above their 1969 levels). Then for eight years there will be a steady decline in the number of college-age youths — to a low point in 1988 — when the national figure will reach approximately its 1970 level and that for Illinois its 1971 level. Both population curves then will start upward again and will pass their 1980 peaks before the year 2000.
2. Enrollment projections for the United States to the year 2000 follow a course essentially parallel to that for college-age population — except that the low point in 1988-89 corresponds approximately to the enrollment projection for 1973-74. Illinois enrollment reaches a peak in 1982-83, followed by a decline to a low point in 1988-89 that is approximately the same as the enrollment level for 1976-77.

   The fact that the enrollment declines during the 1980's do not reach as low levels, relatively, as the drops in college-age population is due to the counteractive effect of rising "enrollment rates" (the number of students, irrespective of age, per 100 college-age youths in the population).
3. The enrollment rates selected for Illinois enrollment projections parallel closely those developed by Master Plan Committee M of the State Board of Higher Education, except that the rise in rate is somewhat slower for the present projections. By 1980, Committee M's rate had reached 78 per cent; whereas the 1980 rate used in the present report is 75.75 per cent, and the level of 78 per cent is not reached until 1985.

   These enrollment rates are considerably higher than the terminal national rate of 54 per cent based upon United States Office of Education figures. Comparisons with the enrollment rates projected for states such as California and New York — as well as other considerations — indicate, nevertheless, that the values used for Illinois projections are realistic.
4. The following pattern of percentage distribution of Illinois enrollment by four educational levels for 1969-70 was used as a model for all future projections: freshman-sophomore, 58.85 per cent; junior-senior, 26.85 per cent; graduate I-professional, 11.60 per cent; graduate II, 2.70 per cent.

   The decision to project according to this constant pattern was reached after examination of conflicting evidence as to whether the proportion of graduate-professional students would be likely to increase or decrease in Illinois during the next decade — as the State moves towards a fully developed system of higher education. Since support for both hypotheses exists, it was decided that use of the 1969-70 distribution pattern for projections to 1980-81 would be a safe compromise.
5. In view of recent reports of the oversupply of doctoral personnel (especially those with the Ph.D. degree), a special section is devoted to a question of whether or not the level and diversity of society's total need for educated manpower is likely to justify the numbers of graduate-professional enrollments projected for Illinois

during the next decade (the following section deals with this problem).

It is concluded from the evidence examined that during the next decade the magnitude of population increase, the parallel growth in the national economy, and the continuing increase in the complexity of society's problems are conditions likely to assure that the State's aggregate need for educated manpower will not be oversaturated by enrollment projections proposed in this document.

THE NEED FOR EDUCATED MANPOWER

The enrollment projections proposed for the State of Illinois rest on two basic premises: (a) that the number of Illinois youths seeking higher education — whether as a means to self-fulfillment or in preparation for productive employment, or both — will be sufficient to meet the projections; (b) that the level and diversity of society's total need for educated manpower will fully require the numbers of enrollments projected for the ten-year period. The probable magnitude of population increase, the parallel growth in the national economy, and the continuing increase in the complexity of society's problems — all these conditions seem likely to assure that in the aggregate the State's need for educated manpower would not be oversaturated by the output of the program of expansion outlined in the foregoing pages.

This judgment is made in the face of a rising tide of recent reports in news media and in professional journals about the oversupply of Ph.D. graduates in various fields. Such terms as "academic recession" and "the doctoral glut" have become increasingly frequent during the past year. Allan M. Cartter, for example, has been predicting for some time a balance of supply and demand for doctoral graduates in the 1970's; and he asserts flatly[1] that the shortage of Ph.D. holders we have lived with for most of thirty-five years is over. And he thinks that graduate schools may be entering a period of excess capacity and overproduction.

Undoubtedly, an undertermined number of recent doctoral graduates in certain fields have been unable to find jobs. What is not clear about these reports, however, is the extent to which no jobs whatever were available in these fields or whether it was a shortage of the kinds of jobs sought in preferred locations.

The recently published volume by Folger, Astin, and Bayer[2] is a timely contribution to the discussion of supply and demand for educated manpower — bringing to this controversial subject the broad perspective of systematic manpower analysis and by far the most comprehensive body of information yet assembled on the development and utilization of individuals of high intellectual ability. Issued after several years of study — under the sponsorship of the American Council on Education, the American Council of Learned Societies, the National Academy of Sciences-National Research Council, and the Social Science Research Council — this monumental work provides both broad perspective and specific data that are useful in long-range educational planning.

In discussing the concept of "demand" for college-educated manpower, for example, Folger *et al.* emphasize the distinction between *demand* (the number of jobs available at a given time in an occupation) and *need* (the number of persons required to provide a desirable level of service). Long-range planning should at least be oriented towards meeting individual and social needs — as these might be articulated in terms of state or national goals — not solely towards meeting projections of current levels of demand. This distinction is particularly important to higher education at the present time — a period of economic recession, growing unemployment, severe reductions in federal support for research and other phases of education, and general retrenchment in the cultivation of society's human resources. It would not seem to be in the long-term public interest to project the future development of higher education in terms of the manifest parameters of the current indicators of "demand."

Folger, Astin, and Bayer present an analysis of the balance between the college graduates needed during the period 1965-75 to achieve national goals (as estimated in the National Goals Project) and the estimated supply. The results indicated a big gap between the available supply and the estimate of needs (*op. cit.*, p. 37).

With respect to the employment outlook for college teaching, Folger *et al.* present a more optimistic picture than Cartter and others who have looked rather more at "demand" than at "need." They note, for example, that average teaching load nationally increased from 15 students per faculty member in 1955 to 18 by 1965; and that only 58 per cent of the regular faculty in the arts and sciences in four-year colleges and universities had Ph.D. degrees. These conditions have developed because of the acute shortages of doctoral personnel in the past. As the supply increases, improvement in the quality of faculties can be expected, and should be sought.

These authors also reviewed the probable demand (not "need") in seven professions (engineering, elementary and secondary school teaching, law, medicine, nursing, social welfare occupations, and the performing arts). In all except school teaching and the performing arts, the output

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[1] Allan M. Cartter, "The After Effects of Putting the Blind Eye to the Telescope." Paper presented at the Twenty-fifth National Conference on Higher Education, sponsored by the American Association for Higher Education, Chicago, March 3, 1970.

[2] John K. Folger, Helen S. Astin, and Alan E. Bayer, *Human Resources and Higher Education*. Staff Report of the Commission on Human Resources and Advanced Education. Russell Sage Foundation, 1970.

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of graduates falls short of meeting the estimated
("need" was not at issue in this analysis).

In general, it may be concluded that the Folge
Bayer volume does not provide much support
highly pessimistic outlook of Cartter and others
ing long-term demand — and certainly not as
the *need* — for educated manpower. It will al
difficult in a free society to adjust supply and
relationships so as to avoid surpluses and defici
dividuals educated for highly specialized vocatic
short-run hardships will inevitably result. But
long run, these imbalances will be overcome — sc
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occupation by the displacement of poorly tra
better-educated individuals.

In educational planning for the next decade,
serious problem than the "overproduction" of h
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scheduled for continuing "depression" — is lik
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the output of higher education — especially a
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ideal conception of national "need." But l
planning should at least be oriented in that di
recognizing that continuous pragmatic adjustme
necessary in order to find a feasible course some
tween projections based upon the status quo (
and planning guided by the long-term philoso
of a democratic society.

Finally, it should be observed that more important in long-range educational planning than numerical projections of enrollment — which can be continuously and readily modified as relevant conditions warrant — are the substantive tasks of adjusting institutional responsibilities, curricular content, and instructional resources to the changing demands of society.

GENERAL PLANNING ASSUMPTIONS

The assumptions to be outlined here relate mainly to broad policies and boundary conditions that have guided the formulation of the University's development plan — including established policies of the Board of Higher Education.

1. *That the University of Illinois now has a unique role in the State system of higher education and that this status should be reflected in Master Plan-Phase III. More specifically, it is assumed that the University will have priority in responsibility for the future expansion of advanced graduate and professional education among the public universities of Illinois, together with associated research and public service.*

The development of Master Plan-Phase III by the Board

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highest average ratings within these divisions and having at least two departments rated as "Distinguished." The University of Illinois appeared in three of these five lists (biological sciences, physical sciences, engineering). Furthermore, its programs in the humanities and social sciences were judged generally to be "Strong."

It is firmly believed that the best interests of the State will be served if the University not only is encouraged to maintain the high quality of its present programs but is granted priority in responsibility for whatever expansion of advanced graduate and professional education might be projected under Master Plan-Phase III. This does not mean that the University seeks a monopoly upon all programs at this level in all fields; but it is believed that in a period of some uncertainty as to how much expansion of these functions might be needed during the next two decades — especially during the 1980's — considerations of economy and the assurance of quality argue convincingly for concentration of them at the University of Illinois. A comprehensive university such as the Uni-

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[3] Allan M. Cartter, *An Assessment of Quality in Graduate Education.* American Council on Education, 1966.

during the next decade (the following section deals with this problem).

It is concluded from the evidence examined that during the next decade the magnitude of population increase, the parallel growth in the national economy, and the continuing increase in the complexity of society's problems are conditions likely to assure that the State's aggregate need for educated manpower will not be oversaturated by enrollment projections proposed in this document.

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Undoubtedly, an undertermined number of recent doctoral graduates in certain fields have been unable to find jobs. What is not clear about these reports, however, is the extent to which no jobs whatever were available in these fields or whether it was a shortage of the kinds of jobs sought in preferred locations.

The recently published volume by Folger, Astin, and Bayer[2] is a timely contribution to the discussion of supply and demand for educated manpower — bringing to this controversial subject the broad perspective of systematic manpower analysis and by far the most comprehensive body of information yet assembled on the development and utilization of individuals of high intellectual ability. Issued after several years of study — under the sponsorship of the American Council on Education, the American Council of Learned Societies, the National Academy of Sciences-National Research Council, and the Social Science Research Council — this monumental work provides both broad perspective and specific data that are useful in long-range educational planning.

In discussing the concept of "demand" for college-educated manpower, for example, Folger *et al.* emphasize the distinction between *demand* (the number of jobs available at a given time in an occupation) and *need* (the number of persons required to provide a desirable level of service). Long-range planning should at least be oriented towards meeting individual and social needs — as these might be articulated in terms of state or national goals — not solely towards meeting projections of current levels of demand. This distinction is particularly important to higher education at the present time — a period of economic recession, growing unemployment, severe reductions in federal support for research and other phases of education, and general retrenchment in the cultivation of society's human resources. It would not seem to be in the long-term public interest to project the future development of higher education in terms of the manifest parameters of the current indicators of "demand."

Folger, Astin, and Bayer present an analysis of the balance between the college graduates needed during the period 1965-75 to achieve national goals (as estimated in the National Goals Project) and the estimated supply. The results indicated a big gap between the available supply and the estimate of needs (*op. cit.,* p. 37).

With respect to the employment outlook for college teaching, Folger *et al.* present a more optimistic picture than Cartter and others who have looked rather more at "demand" than at "need." They note, for example, that average teaching load nationally increased from 15 students per faculty member in 1955 to 18 by 1965; and that only 58 per cent of the regular faculty in the arts and sciences in four-year colleges and universities had Ph.D. degrees. These conditions have developed because of the acute shortages of doctoral personnel in the past. As the supply increases, improvement in the quality of faculties can be expected, and should be sought.

These authors also reviewed the probable demand (not "need") in seven professions (engineering, elementary and secondary school teaching, law, medicine, nursing, social welfare occupations, and the performing arts). In all except school teaching and the performing arts, the output of graduates falls short of meeting the estimated *demand* ("need" was not at issue in this analysis).

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[1] Allan M. Cartter, "The After Effects of Putting the Blind Eye to the Telescope." Paper presented at the Twenty-fifth National Conference on Higher Education, sponsored by the American Association for Higher Education, Chicago, March 3, 1970.

[2] John K. Folger, Helen S. Astin, and Alan E. Bayer, *Human Resources and Higher Education.* Staff Report of the Commission on Human Resources and Advanced Education. Russell Sage Foundation, 1970.

In general, it may be concluded that the Folger-Astin-Bayer volume does not provide much support for the highly pessimistic outlook of Cartter and others regarding long-term demand — and certainly not as regards the *need* — for educated manpower. It will always be difficult in a free society to adjust supply and demand relationships so as to avoid surpluses and deficits of individuals educated for highly specialized vocations; and short-run hardships will inevitably result. But in the long run, these imbalances will be overcome — sometimes through the upgrading of the quality of manpower in an occupation by the displacement of poorly trained by better-educated individuals.

In educational planning for the next decade, a more serious problem than the "overproduction" of highly educated manpower in certain fields — which may well occur unless "planned" higher education as a whole is scheduled for continuing "depression" — is likely to be the failure to meet the needs generated by the complexities of modern society and its physical environment. It may not be realistic to expect that future "demand" for the output of higher education — especially at the advanced levels — can be raised to the level projected in an ideal conception of national "need." But long-range planning should at least be oriented in that direction — recognizing that continuous pragmatic adjustment will be necessary in order to find a feasible course somewhere between projections based upon the status quo (or worse) and planning guided by the long-term philosophic goals of a democratic society.

Finally, it should be observed that more important in long-range educational planning than numerical projections of enrollment — which can be continuously and readily modified as relevant conditions warrant — are the substantive tasks of adjusting institutional responsibilities, curricular content, and instructional resources to the changing demands of society.

GENERAL PLANNING ASSUMPTIONS

The assumptions to be outlined here relate mainly to broad policies and boundary conditions that have guided the formulation of the University's development plan — including established policies of the Board of Higher Education.

1. *That the University of Illinois now has a unique role in the State system of higher education and that this status should be reflected in Master Plan-Phase III. More specifically, it is assumed that the University will have priority in responsibility for the future expansion of advanced graduate and professional education among the public universities of Illinois, together with associated research and public service.*

The development of Master Plan-Phase III by the Board of Higher Education has particular significance for the University of Illinois, which differs from all other institutions of higher education in the State in the scope and diversity of its responsibilities in the areas with which Phase III will be concerned: graduate education and research in the fundamental branches of learning; teaching and research in the professional and technical fields that are heavily dependent upon advanced learning in the fundamental disciplines and highly important to the public welfare; the creative and performing arts; diversified programs of public service that bring continuing education and technical assistance of a high order to a state-wide clientele. The latter includes governmental agencies and other social institutions concerned with health, education, economic affairs, community welfare, and human relations.

Historically grounded in the "land-grant" tradition, with its original emphasis upon the democratization and individualization of educational opportunity, the University of Illinois has evolved during its first century into a genuinely comprehensive state university which is recognized as one of the nation's foremost centers of learning. The results of several evaluative surveys conducted since World War II have attested to the excellence of the University's graduate programs and to their high national standing. All of them have placed the University of Illinois within the top ten or twelve universities in the country in terms of the quality of its faculty and the excellence of its programs. The latest of these studies — conducted by Allan M. Cartter for the American Council on Education — evaluated graduate programs in five general areas of study.[3] The "leading universities" in each area were then identified on the basis of having the highest average ratings within these divisions and having at least two departments rated as "Distinguished." The University of Illinois appeared in three of these five lists (biological sciences, physical sciences, engineering). Furthermore, its programs in the humanities and social sciences were judged generally to be "Strong."

It is firmly believed that the best interests of the State will be served if the University not only is encouraged to maintain the high quality of its present programs but is granted priority in responsibility for whatever expansion of advanced graduate and professional education might be projected under Master Plan-Phase III. This does not mean that the University seeks a monopoly upon all programs at this level in all fields; but it is believed that in a period of some uncertainty as to how much expansion of these functions might be needed during the next two decades — especially during the 1980's — considerations of economy and the assurance of quality argue convincingly for concentration of them at the University of Illinois. A comprehensive university such as the University of Illinois provides the most economical and most effective institutional means whereby the State can be assured of maintaining the broad range of specialized faculties, facilities, and programs that will be required to keep it abreast of the rapidly changing technical and professional needs of modern society. This is true not only because of the disproportionate cost to the State of trying to duplicate such resources in other institutions — without assurance that the expected quality and productivity would be forthcoming — but there is the further consideration that no other public institution could begin to match the University of Illinois in securing the outside support from federal and foundation sources that will be essential to supplement the State's contributions.

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[3] Allan M. Cartter, *An Assessment of Quality in Graduate Education.* American Council on Education, 1966.

2. *That the University's claim to priority among the public universities of Illinois in advanced graduate studies and research should be particularly recognized for programs involving multidisciplinary study and investigation.*

The latter can be conducted at a satisfactory level of quality only by an institution with a wide range of scientific expertise, technical specialists, and supporting technical resources. It is such considerations that led the National Science Board in a recent publication[4] to make the following statement:

> "Opportunities for public service may also require the development of graduate programs of a multidisciplinary character, variously involving the natural sciences, the social sciences including law, medicine, and engineering, as well as the arts and humanities. Here again, the quality of these contributions will determine the ultimate value of the product. A first-rate multidisciplinary program cannot be compounded from second-rate disciplinary efforts."

This advice is particularly pertinent at a time of widespread public concern over social and general environmental conditions that require multidisciplinary attention — for purposes both of scientific understanding and of effective remediation. Under the pressures generated by such concern, public agencies and institutions may be strongly tempted to rush indiscriminately into hastily improvised multidisciplinary programs and makeshift "action" projects — irrespective of the background of scholarly expertise and other technical resources needed to assure a high level of quality and effectiveness in such undertakings. Too many federal programs in recent years have encouraged this general pattern of well-intentioned but unproductive response to critical human needs and social problems. Aside from ineffectuality in achieving immediate objectives, such efforts generate a sense of frustration and resentment on the part of would-be beneficiaries — as well as distrust on the part of the general public of rational-technical approaches to solving such problems.

The University recognizes the existence of a great diversity of human needs and social problems, with correspondingly varied requirements of expertise and other resources for relevant response by educational institutions. Hence, it does not assert a monopolistic claim to all types of instructional or public-service programs of problem-solving nature. Instead, it is urged that the University be given priority in responsibility for those instructional, research, and public-service programs of this type that require doctoral-level education (or the equivalent), together with highly technical multidisciplinary resources and a broad base of supporting disciplinary programs of high quality. Even with an unnecessary expenditure of State funds in the effort to duplicate such disciplinary resources in other State institutions, the probability of securing comparable quality is not high. Furthermore, as noted above, the University of Illinois is able to attract a far higher level of outside support for multidisciplinary programs than other state-supported universities.

3. *That the Chicago Circle campus be expanded as rapidly as possible into a comprehensive urban university.*

It is assumed that the nation's second-largest metropolitan area should have a public university of the first rank — offering graduate, research, and public-service programs commensurate in scope and diversity with the varied needs of the area's people and with the magnitude of the problems of its physical environment.

An adequate university-level response to these needs will require substantial programs of high quality in all of the fundamental disciplines that must undergird the multidisciplinary programs which the Chicago Circle campus will conduct — partly through the new College of Urban Sciences and partly through the other professional colleges.

An additional set of arguments for full-scale development of the University at Chicago Circle relates to the need to provide adequate educational opportunity to the able college graduates of the area who could not afford the high cost of private institutions (assuming the latter could admit them and meet costs not covered by tuition); nor, for the same general reason, would they be able to attend graduate or professional school elsewhere. The declining sources of support already in evidence for graduate students will hit such students particularly hard.

A strong testimonial to the uniqueness of the University's mission within the State system of higher education — and especially to the University's position that the Chicago Circle campus should be brought into full-scale participation in that mission — is found in the following excerpt from the *Report of the Special Committee on*

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[4] National Science Board, *Towards a Public Policy for Graduate Education in the Sciences.* National Science Foundation, 1969 (p. 28).

New Institutions, which was submitted to the Board of Higher Education on December 20, 1967:

> "The University of Illinois performs a wide variety of functions, but its unique and dominant mission appears to be the advancement of knowledge through research and education at the highest levels. Toward this end, it has assembled an illustrious staff of scholars and researchers, many of them among the foremost leaders in their disciplines. Through its excellent programs and its scholarly productivity, the University has brought academic luster to the State.
>
> "Further, the University is expanding rapidly its brand of excellence. Chicago Circle is bending its full efforts toward development of advanced graduate and research programs. Even before it has granted a master's degree in any one of its thirteen recently approved master's degree programs, the Circle campus is pressing hard for approval of several doctoral programs. In the finest tradition of America's great universities and typical of the style developed at the parent campus in Urbana, Chicago Circle is recruiting top-flight scholars, amassing a first-rate library collection in its fields of interest, and constructing splendid laboratories and other facilities. Its dominant thrust, clearly, is toward creating a scholarly environment conducive to research and the production of doctoral degrees.
>
> "The University takes great pride, and rightfully so, in its development of high-quality educational programs. The very elements which create 'quality' in such an enterprise — the outstanding professor, the collection of rare books, the complex equipment and elaborate facilities — call for tremendous resources. The State should not, and indeed cannot, duplicate these programs elsewhere at this time."

4. *That the University not propose the establishment of new campuses during the next decade, on the assumption that the enrollment projections for the State over the next twenty years do not justify such expansion.*

Should the Board of Higher Education nevertheless decide that an additional campus will be established, the University would wish to consider submitting a proposal for its own involvement in the governance of such a new institution.

5. *That the University's enrollment growth henceforth emphasize upper-division, graduate, and professional education — with little increase beyond 1970 in lower-division enrollment.*

This assumption reflects the policy already applied by the Board of Higher Education to the Urbana-Champaign campus. Although it has not yet been extended by that Board to the Chicago Circle campus, the latter's development plan includes only a slight increase in lower-division enrollment over the next decade.

Realizing the projected growth at upper-division level — without corresponding increases in freshman enrollment — obviously will depend primarily upon the transfer of students from junior colleges. The University has already taken substantial steps towards encouraging such transfers, and its program of articulation will be greatly expanded during the coming decade.

HIGHLIGHTS OF THE UNIVERSITY'S DEVELOPMENT PLAN

The statistical patterning of enrollment distributions — among campuses, educational levels, and areas of study — can indicate the general scope and directions of development embodied in an educational plan; but such numerical characterization can not reflect very adequately a university's significant changes in organizational structure, in curricular objectives and innovation, in research orientation, and in the purposes and strategies of public-service activities. Although a full account of these substantive aspects of the University's future programs will be reserved for later chapters, the present section will include brief discussions of selected major areas that will have special emphasis as the development plan unfolds during the coming decade.

The Health Fields. Partly because planning in these fields began several years ago, but also because of society's acute needs, the programs in the health sciences and professions stand virtually at the top of the University's list of priorities for expansion and improvement during the years immediately ahead. Although concentrated at the Medical Center campus, the other two campuses will also be heavily involved; and regional centers will be established in Peoria, Rockford, and perhaps other areas of the State. The main objectives of these programs are as follows:

1. Increase in the supply of professional manpower, and at the same time expanded opportunities for Illinois youth to enter the health professions. Massive growth in enrollment is planned for the Medical Center campus and its proposed branches — approximately 150 per cent by 1980.

   A School of Basic Medical Sciences is being established at the Urbana-Champaign campus, to be followed as soon as possible by a school offering clinical training to complete the work required for the M.D. degree.

   At the Chicago Circle campus, graduate instruction in the behavioral and social sciences will provide the necessary interdisciplinary components of instruction for graduate degrees in public health and research support for studies of the delivery of health services. A school of basic medical sciences is also under discussion.
2. Curricular revision designed to improve professional education and, especially, to shorten the overall period of training for physicians.
3. The creation of conditions of professional education and practice designed to increase the number of practitioners who remain in Illinois after completing their training. The regional centers mentioned above and

the establishment of a state-wide network for continuing education of practitioners will contribute towards this objective.

4. Improved utilization of professional manpower and other resources involved in the delivery of health care. A proposed Center for the Study of Patient Care and Community Health — part of a new graduate School of Public Health — will be the primary agency for the achievement of this broad purpose. It is expected that all three campuses will participate in this extensive program, which will give attention particularly to the behavioral-social and administrative sciences concerned with the evaluation of the effectiveness of health-care services.
5. Innovation in education for the delivery of health services in urban centers, including new modes of providing health care to inner-city families.

Urban Studies. The complex of individual and social needs arising within the modern urban environment has led at the Chicago Circle campus to the establishment of a College of Urban Sciences, which will become the University's primary focus for interdisciplinary instruction, research, and public service related to the critical problems of urban society. Opportunities will be available to interested faculty members from the other two campuses to participate in all three aspects of the College's program. Furthermore, other colleges and departments at the Chicago Circle campus will provide strong support for the College's innovative instructional activities; and, through joint appointments, they will participate in its various task forces to be organized for multidisciplinary research and related public service.

Both undergraduate and graduate instruction will be offered; and, at both levels, course work and research training will involve direct interaction with local communities and institutions.

In graduate study, the College of Urban Sciences will concentrate upon professional training, including a professional doctorate. The College will become one of the principal instrumentalities through which the University will cultivate greatly expanded programs of graduate education for a variety of "public-service professions." Public administration and urban planning are examples. In addition, the new College will develop professional specialties involving applications of various social sciences to selected classes of urban problems (such as housing, race relations, health and nutrition, employment, recreation, crime and delinquency, the maintenance of environmental quality, and economic development).

The other professional colleges at the Chicago Circle campus — Architecture and Art, Business Administration, Education, and Engineering — will also conduct instructional and research programs with a strong urban emphasis.

Environmental Sciences. The principal new development at the Urbana-Champaign campus is a proposed "Environmental Studies Institute," which would bring into cooperative interaction a wide range of departments in the biological sciences, engineering, agricultural sciences, environmental design fields, and the relevant social sciences.

The Institute would be an autonomous organizational unit whose Director would report to the Chancellor. Although it would rely on other departments for cooperation in the form of joint appointments and other support, the Institute would have its "core" faculty and would be responsible for organizing and administering interdisciplinary courses and research programs.

With the establishment of a program in medical education at the Urbana-Champaign campus, and with the varied activities in the Colleges of Agriculture, Engineering, and Veterinary Medicine concerned with health problems, the Environmental Studies Institute will add substantially to the campus resources for instruction and research in environmental health.

Improving the Cultivation and the Utilization of Human Resources. The long-range plans of all three campuses emphasize a variety of programs designed to improve the quality of education and to increase the effectiveness of society's utilization of its human resources through productive employment. Particular interest at the Chicago Circle and the Urbana-Champaign campuses, for example, will be focused upon educationally and economically "disadvantaged" individuals — with the broad purpose of raising their level of educational achievement, increasing their effectiveness as members of social groups, and helping to facilitate their assimilation into productive jobs.

As already noted, the Medical Center campus is experimenting with new modes of delivery of health care in inner-city communities. These activities will be expanded in conjunction with the new School of Public Health and its Center for the Study of Patient Care and Community Health.

The Institute of Labor and Industrial Relations, the Jane Addams Graduate School of Social Work, the Institute of Government and Public Affairs, and several departments are planning multidisciplinary studies of the delivery of public services in such areas as social welfare, health, and employment. It is hoped that these studies can be related to the program of the newly established Illinois Institute for Social Policy (an agency of State government).

With respect to educational innovation, the program of the Computer-Based Education Research Laboratory at the Urbana-Champaign campus will be particularly significant. With its PLATO IV system — which has been ten years in development and testing — this Laboratory provides a means whereby substantial gains in educational skills and in vocational competence can be achieved for educationally disadvantaged students. In cooperation with the Curriculum Laboratory of the College of Education at the Urbana-Champaign campus, the Computer-Based Education Research Laboratory has already used the PLATO system in instruction with such groups, and other cooperative endeavors are being planned.

Undergraduate Education. Improvement in the quality of undergraduate education — especially at freshman-sophomore level — will have very high priority among the University's goals for the 1970's. With the stabilization of lower-division enrollment and the reduction in rate of growth in the upper-division student body, more intensive effort can be devoted to this task than has been possible during the twenty-five years since World War II.

Several sets of circumstances during that period have created enormous pressures upon the limited resources available to public universities, with the result that they have been unable to give as much attention to undergraduate education as the importance of this central aspect of their mission clearly deserves. The following among these conditions have been especially important: (a) the extraordinary enrollment increase due to veterans returning from World War II, which lasted well into the 1950's for those seeking doctoral degrees; (b) the unprecedented demands upon universities for graduate education, research, and development related to the nation's needs in the fields of health, defense, atomic energy, space, education, and various other areas; (c) the massive growth of enrollment in the 1960's, reflecting the sharp upturn in the birthrate after World War II as well as a markedly greater proportion of the college-age population seeking higher education; (d) the rising expectation that universities should utilize their technical and professional expertise for the benefit of a multitude of "publics" in search of solutions to increasingly complex problems.

Universities and their faculties have been diversely criticized for the over all outcome of their multiple responses to these competing needs during the last quarter of a century. And from the individual perspectives of any one of the interests represented in the foregoing list, it is relatively easy to identify deficiencies in what has been accomplished. Perhaps the most prominent of the complaints has been that faculty members have engaged in a mass "flight from teaching," as a willful and welcomed escape from their responsibilities for undergraduate education — with the acquiescence, if not outright encouragement, of their universities.

While this is not the place for a full discussion of this controversial subject, a few observations would seem to be in order. First, it certainly is true that since World War II large numbers of faculty members — in total a far higher proportion than ever before in higher education — have spent most of their time in graduate education and research, and have done little or no undergraduate teaching. Second, no definitive body of evidence has been assembled concerning the motivation underlying the professional commitments of this segment of university faculties (e.g., as to what proportion of these individuals unreservedly preferred their noninvolvement in undergraduate teaching, in contrast to those who found this to be a hard but seemingly inescapable choice under the circumstances). Third, an acute shortage of faculty-calibre manpower has existed during that period — in large part due to the fact that the enormous and unprecedented postwar burden of teaching, research, and public service has had to be carried somehow by a disproportionately small professional population derived from earlier periods of very low birthrates.

Irrespective of the justification for the priority judgments concerning the use of available professorial manpower, probably very few university educators would deny that the quality of undergraduate education in large universities has been in certain respects less than satisfactory since World War II. There has been too great reliance, for example, upon graduate assistants as teachers in freshman-sophomore courses. Too many classes have been too large — even though some of the most effective instruction has sometimes occurred in large lecture courses taught by outstanding teachers. Departmental and other administrative officers, as well as faculty leaders, have too often failed to give sufficient encouragement and recognition to teaching as a professional career and as a basic educational function. Undergraduate curricula have too frequently mirrored the pattern of disciplinary graduate specialization, rather than being uniquely designed to meet the educational needs of undergraduates. A related shortcoming has been the failure of graduate schools and departments to train enough of their doctoral students in the kinds of scholarship and special skills required for effective teaching.

These shortcomings have been mitigated to a considerable degree at the University of Illinois by the establishment of a variety of special programs: the James Scholar program, with its special honors seminars and sections of regular courses; a program of "Undergraduate Instructional Awards," consisting of grants to selected faculty members for summer projects designed to improve undergraduate teaching; offices of instructional resources at all three campuses which provide professional services and teaching aids to departments and individual faculty members seeking to evaluate and improve instruction; formal programs for training teaching assistants and supervising their work; special departmental appointments and provision of associated facilities for the improvement of instruction in basic undergraduate courses.

Although these steps have generally yielded highly beneficial results, they have not been adequate, either in kind or in scope, to the magnitude of the educational task.

Furthermore, they have not been uniformly effective in all areas of instruction. A more systematic, more pervasive, and more massive attack upon all of the major types of shortcomings identified above — and that list is not an exhaustive one — needs to be undertaken. This will be one of the University's foremost tasks for the 1970's — a responsibility whose importance is measured partly by the fact that at the end of the present planning period (1980-81), undergraduate enrollment at all three campuses is projected to be 51,300 students — or about two-thirds of the total enrollment of 77,700 on the three campuses. (This would be an increase of 11,504 above the figure of 39,796 undergraduates in the fall term of 1969-70.) Most of them will be located at the Chicago Circle and the Urbana-Champaign campuses.

In order to reinforce the efforts of the individual undergraduate colleges, a senior academic officer under the Chancellor will be appointed at each of these two campuses, with responsibility for planning, coordinating, and evaluating programs directed towards the improvement of undergraduate instruction. His functions would be parallel in certain respects to those of the Dean of the Graduate College for graduate education. (It is assumed that no separate office for this purpose need be created at the Medical Center campus, since all undergraduates there are in specialized professional programs.)

At general University level, a senior academic officer will be appointed under the Executive Vice President and Provost with University-wide responsibilities for planning, coordinating, and evaluating programs related to undergraduate education. As an advisory body to that officer, and under his chairmanship, a University Council on Undergraduate Education will be established. The membership would include the chief campus officers just mentioned, as well as representative faculty members and students. The first task of this Council would be to develop program proposals and operational guidelines for consideration by the newly established offices concerned with undergraduate education.

As already indicated, the focus of these activities would be upon plans and programs for the improvement of undergraduate education, in which continuing evaluation would play a major role. These special administrative offices would not supersede or encroach upon the prerogatives of existing faculty bodies or other administrative offices.

Changing Emphases in Graduate-Professional Education. In conjunction with the improvement of undergraduate education, and in line with the growing national interest in a new type of "teaching doctorate," both the Urbana-Champaign and the Chicago Circle campuses plan to enroll a substantial number of their future graduate students, in a variety of disciplines, in new curricula leading to the degree of Doctor of Arts. This type of program will not involve the intensive type of research training, including "original" investigation, that is required for the Ph.D. degree; but it will have equivalent scholarly requirements and standards. Instead of the research dissertation, practical experience will be provided in laboratory-type instruction concerned with curriculum development and teaching techniques. This aspect of the program will be essentially a "professional" component designed specifically to improve the teaching skills of the trainee in his academic subject. The remainder of the curriculum will be similar to that followed for the Ph.D. degree, although variations will be allowed more freely in the Doctor of Arts program to permit the inclusion of courses in other departments and interdisciplinary courses.

Although the Doctor of Arts degree will provide an appropriate background for all levels of undergraduate education, it will be particularly good preparation for teaching in junior colleges. The curricula for this degree will be developed in consultation with junior-college faculty members and administrators.

In the earlier discussions of the health fields and urban studies, the need for more professionals with a different form of advanced education than the Ph.D. degree has been emphasized. At all three campuses, the University will expand existing programs and develop new ones designed to meet the need for high-level administrators and technical personnel with applied-research capabilities. New professional doctorates in such fields as public health, social work, public administration, urban planning, and engineering are examples of these programs. They will have a strong multidisciplinary orientation that will include varied experience in concrete institutional settings (internships, participation in evaluation studies, applied-research projects, etc.). Such training should inculcate into the graduates the kinds of interests and skills that are needed for more effective attack upon the complex problems of modern society.

In planning an increase in emphasis upon advanced professional-technical training, it should be stressed that this need not be done through weakening the University's strong commitment to graduate education leading to the Ph.D. degree and the basic research associated with it. Indeed, it will be necessary to strengthen and expand both of these disciplinary functions in many fields — especially at the Chicago Circle campus — in order to provide a sound scholarly foundation for the interdisciplinary and multidisciplinary activities involved in professional education, applied research, and high-level public service.

Other Developments. In the following chapters on the plans for the three campuses and for general University programs, additional developments of great importance to the University and the State will be discussed. These will include the establishment of new schools, departments, degree curricula, and research centers. And they will also stress important shifts of emphasis within existing colleges and departments. For example, the Colleges of

Engineering at both the Chicago Circle and the Urbana-Champaign campuses are planning a major reorientation of their programs towards greater emphasis upon interdisciplinary studies related to the quality of the physical environment and upon those aspects of social problems that are amenable to engineering study in cooperation with social scientists.

Finally, a major reorganization of the University's extension and public-service activities will be carried out — involving new administrative arrangements and programs at each of the three campuses, and the appointment of a general University officer with responsibility for system-wide planning and coordination of these functions. This and other University-wide developments are discussed in the last chapter of the Provisional Development Plan.

The Urbana-Champaign Campus

Having recently completed its first century of growth, the University's Urbana-Champaign campus has reached substantial maturity in its instructional and research programs. This does not mean that a full complement of courses or degree programs is offered in all disciplines, professions, and technical fields, since many omissions could be cited in all of these categories. But except for the health sciences and professions, the Urbana-Champaign campus has reached a developmental stage approximately comparable to that achieved by other institutions of its type and age.

Eighty curricula are offered leading to doctoral degrees: 70 for the Ph.D. degree and 10 for doctorates in professional fields. The complete list is presented in Table I. For the year 1969-70, some 778 doctoral degrees were awarded at the Urbana-Champaign campus — 706 Ph.D. degrees and 72 professional doctorates. Although no comparable figures are available yet for this period from other universities, earlier comparisons place the University of Illinois near the top of all other institutions in the country in the production of doctorates. For example, the Urbana-Champaign campus stood fourth among all graduate institutions in the country in the number of doctorates awarded in 1967-68 (the latest year for which comparable figures are available). According to a report by the National Academy of Sciences, over the eight-year period 1958-66 the University of Illinois (the Urbana-Champaign and the Medical Center campuses) stood first among all graduate institutions in the number of doctorates awarded. (Most of the University's degrees were awarded by the Urbana-Champaign campus during that period.)

TABLE I. DOCTORAL DEGREE PROGRAMS OFFERED BY THE UNIVERSITY OF ILLINOIS AT THE URBANA-CHAMPAIGN CAMPUS

Ph.D. Degrees (70)

Accountancy
Aeronautical and Astronautical Engineering
Agricultural Economics
Agricultural Engineering
Agronomy
Animal Science
Anthropology
Art, History of
Astronomy
Biology
Biophysics
Botany
Business
Ceramic Engineering
Ceramics
Chemical Engineering
Chemical Physics
Chemistry
Civil Engineering
Classical Philology
Communications
Comparative Literature
Computer Science
Dairy Science
Dairy Technology
Economics
Education
Electrical Engineering
English
Entomology
Finance
Food Science
French
Genetics
Geography
Geology
German
History
Home Economics
Horticulture
Italian
Labor and Industrial Relations

Ph.D. Degrees (continued)

Library Science
Linguistics
Marketing
Mathematics
Mechanical Engineering
Metallurgical Engineering
Microbiology
Mining Engineering
Musicology
Nuclear Engineering
Nutritional Sciences
Philosophy
Physical Education
Physics
Physiology
Plant Pathology
Political Science
Portuguese
Psychology
Russian
Sanitary Engineering
Sociology
Spanish
Speech
Statistics
Theoretical and Applied Mechanics
Veterinary Medical Science
Zoology

Professional Doctorates (10)

Doctor of Art Education
Doctor of Business Administration
Doctor of Education in Education
Doctor of Library Science
Doctor of Musical Arts
Doctor of Music Education
Doctor of Psychology
Doctor of the Science of Law
Doctor of Veterinary Medicine
Juris Doctor

The comparative quality of the graduate and research programs at the Urbana-Champaign campus is indicated by the results of the study conducted for the American Council on Education by Allan M. Cartter.[5] As already noted, the University of Illinois was placed among the top universities in the nation on the basis of ratings of its doctoral programs and graduate faculty; and its standing was based almost entirely on the evaluations of graduate work offered at the Urbana-Champaign campus. (The Chicago Circle campus had no graduate programs at the time of the Cartter study, and very few of the fields surveyed are offered at the Medical Center campus.) It should be emphasized, furthermore, that the national distinction of the University of Illinois at Urbana-Champaign has long been recognized. In an evaluation study conducted in 1924 by Raymond Hughes — and reported at the 1925 annual meeting of the Association of American Colleges — the University of Illinois was ranked eleventh among American universities in quality of graduate education.

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[5] Allan M. Cartter, *An Assessment of Quality in Graduate Education.* American Council on Education, 1966.

Additional evidence of the depth and variety of interests in graduate education, research, and development at the Urbana-Champaign campus is provided in the selected list of its special centers, institutes, laboratories, and other research agencies presented in Table II. These units are quite diverse in organizational status, function, and level of effort. Several of them are essentially coordinating agencies — without direct responsibility for conducting programs but playing an important role in interdisciplinary planning and in securing support for their cooperating groups from within and outside the University. Others are departmental research laboratories, with continuing programs of substantial magnitude in specialized areas. A few are large-scale interdisciplinary or multidisciplinary centers which provide research support for large numbers of faculty members, graduate students, and postdoctoral trainees.

TABLE II. SELECTED LIST OF CENTERS, LABORATORIES, AND OTHER UNITS CONCERNED WITH RESEARCH AT THE URBANA-CHAMPAIGN CAMPUS

- I. **Graduate College**
  - Atmospheric Research Laboratory
  - Center for Advanced Computation (pending)
  - Center for Advanced Study
  - Center for Human Ecology
  - Children's Research Center
  - Computer-Based Education Research Laboratory
  - Illinois Historical Survey
- II. **College of Agriculture**
  - Burnsides Research Laboratory
  - Crop Evolution Laboratory
  - Dixon Springs Agricultural Center
  - Reproductive Physiology and Endocrinology Laboratory
- III. **College of Commerce and Business Administration**
  - Bureau of Economic and Business Research
- IV. **College of Communications**
  - Institute of Communications Research
- V. **College of Education**
  - Bureau of Educational Research
  - Curriculum Laboratory
  - Institute for Research on Exceptional Children
- VI. **College of Engineering**
  - Aeronomy Laboratory
  - Coordinated Science Laboratory
  - Gaseous Electronics Laboratory
  - Materials Research Laboratory
  - Nuclear Reactor Laboratory
  - Physics Research Laboratory (Betatron)
  - Soil Mechanics and Foundations Laboratory
- VII. **College of Fine and Applied Arts**
  - Small Homes Council–Building Research Council
- VIII. **College of Liberal Arts and Sciences**
  - Center for Asian Studies
  - Center for Comparative Psycholinguistics
  - Center for Human Ecology
  - Center for Latin-American Studies
  - Center for Russian and East European Studies
  - Personality and Group Analysis Laboratory
  - Speech and Hearing Clinic
  - Vermilion River Observatory
- IX. **College of Veterinary Medicine**
  - Center for Zoonoses Research and Comparative Medicine
- X. **Institute of Aviation**
  - Aviation Research Laboratory
- XI. **Office of International Programs**
  - Center for International Comparative Studies
  - Center for International Education and Research in Accounting
- XII. **Graduate School of Library Science**
  - Library Research Center
- XIII. **University-wide Units**
  - Institute of Government and Public Affairs
  - Institute of Labor and Industrial Relations
  - Survey Research Laboratory

The graduate departments at the Urbana-Champaign campus and the specialized research units listed in Table II account for most of the University's high level of federal support for research and graduate education. In terms of federal funds provided for academic science in fiscal year 1967, for example, the University of Illinois ranked third among universities in the nation — its total of $52,446,000 being exceeded only by the grants to the Massachusetts Institute of Technology and to the University of Michigan.

Despite the recent decline in federal funds in certain fields, the University's overall level of support remains high — as does its comparative standing by this measure among other universities. The Urbana-Champaign campus expects federal grants at a relatively high level to continue for its programs of graduate instruction and research during the 1970's This campus should thus be able to maintain its status as the most productive institutional channel through which the State receives federal support for its programs of advanced graduate and professional education, research, and research-related public service.

The educational programs of the Urbana-Champaign campus at all levels will undergo marked changes during the next ten years — in response to new conditions and to the needs generated by them. In the spirit of the University's hundred years as a land-grant institution, the development plan for this campus calls for full utilization of its wealth of resources towards finding better ways to meet human needs and to help society solve its critical problems. These efforts will involve the search for new fundamental knowledge in difficult fields of inquiry, problem-centered research and development, and unique modes of public service that only a comprehensive university of high quality can provide.

ENROLLMENT GROWTH

The headcount enrollment for the fall term of 1969-70 at the Urbana-Champaign campus was 32,759 students. The questions of how much to increase enrollment beyond that figure by 1980-81, and how such increases should be distributed by levels and fields of study, were among the central issues facing the campus special committee on long-range planning. Surveys of the attitudes of departments, colleges, and other units as to the overall optimal size of the campus indicated a desire to hold enrollment to a level somewhere between 35,000 and 40,000 students. But the summation of the individual departmental and college requests yielded a total of almost 49,000 students! After lengthy discussions and adjustments designed to reconcile these incompatible "projections," the committee settled provisionally upon 39,200 students as a target figure for 1980-81. This was subsequently increased to 39,800, which is the number shown in Table III. Of this total, 25,000 would be undergraduate and 14,800 would be graduate and professional students.

For comparative purposes, the following were the enrollments at the main campuses of the public institutions among the "Big Ten" universities in the fall of 1969:

Indiana University (Bloomington)	29,309
University of Illinois (Urbana-Champaign)	32,759
University of Iowa (Iowa City)	20,236
University of Michigan (Ann Arbor)	32,003
Michigan State University (East Lansing)	40,820
University of Minnesota (Minneapolis-St. Paul)	42,996
Ohio State University (Columbus)	45,009
Purdue University (Lafayette)	25,037
University of Wisconsin (Madison)	35,549

Distribution of Enrollment by Educational Level. Most of the increase of 7,041 students from 1969-70 to 1980-81 would be at the graduate-professional level (5,472 graduate-professional, 1,569 undergraduate). The figures in Table III show a gradual change in the percentage distribution over the twelve-year period from undergraduate to graduate levels. In 1980-81, approximately 37 per cent of the enrollment would be at the two graduate levels, while for 1969-70 the figure was 28.48 per cent. It should be noted that the graduate-professional projections for 1980-81 are lower percentagewise than those shown earlier (Chapter II of the plan) for the University of California in 1975 (for the Berkeley campus, 49 per cent graduate; University of California system, 40 per cent graduate).

TABLE III. ENROLLMENT DISTRIBUTION FOR THE URBANA-CHAMPAIGN CAMPUS BY LEVEL — 1969-70 TO 1980-81*

Fall Term	*Lower Division*	*Upper Division*	*Graduate I-Professional*	*Graduate II*	*Total*
1969					
Number	11,883	11,548	4,724	4,604	32,759
Per cent	36.27%	35.25%	14.42%	14.06%	100.00%
1971					
Number	11,871	11,780	5,210	5,040	33,901
Per cent	35.02%	34.75%	15.37%	14.86%	100.00%
1972					
Number	11,884	11,912	5,468	5,281	34,545
Per cent	34.40%	34.48%	15.83%	15.29%	100.00%
1973					
Number	11,889	12,040	5,734	5,515	35,178
Per cent	33.80%	34.22%	16.30%	15.68%	100.00%
1974					
Number	11,900	12,169	5,994	5,745	35,808
Per cent	33.23%	33.99%	16.74%	16.04%	100.00%
1975					
Number	11,915	12,311	6,253	5,989	36,468
Per cent	32.67%	33.76%	17.15%	16.42%	100.00%
1980					
Number	12,000**	13,000	7,600	7,200	39,800
Per cent	30.15%	32.66%	19.10%	18.09%	100.00%

* Actual enrollment (headcount) for 1969-70; projections for 1971-72 and later years.

** An enrollment of over 12,000 is the present estimate for the Lower Division at the Urbana-Champaign campus in the fall term of 1970-71, which will be the upper limit for enrollment at that level.

As regards the rate of growth over the twelve-year period (1969-70 to 1980-81), the average increase per year is approximately 640 students, while that for the ten-year period from 1971-72 through 1980-81 is 655 students. This annual increment may be compared with the average annual increase of 1,200 students for the ten years between 1960-61 and 1969-70.

The following figures summarize the comparative increases in numbers and in percentages of enrollments for the two ten-year periods:[6]

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[6] There are nine increments of increase within each of the ten-year periods involved in these comparisons.

	Undergraduate (Both Levels)	Graduate I, II-Professional	Total
1960-61	17,003	4,952	21,955
1969-70	23,431	9,328	32,759
Increase: Number	6,428	4,376	10,804
Per cent	37.80%	88.36%	49.20%
Per year[6]	714	486	1,200
1971-72	23,651	10,250	33,901
1980-81	25,000	14,800	39,800
Increase: Number	1,349	4,550	5,899
Per cent	5.73%	44.38%	17.40%
Per year[6]	150	505	655

Distribution of Graduate-Professional Enrollment by Broad Areas of Study. Parallel to the analysis for the University as a whole presented earlier, the percentage distributions of postbaccalaureate enrollment among the eleven broad areas of study are presented in Table IV, for the years 1969-70 and 1980-81. Enrollment increases are shown over this period for all areas, and at both educational levels; but the rates of growth vary substantially among the eleven areas, with resulting "gains" and "losses" in the proportionate share of the campus total. These trends serve, therefore, as rough indicators of changing emphasis among the areas. Such interpretations should be made cautiously, however, as the earlier discussion of University-wide patterns has suggested.

Comparing the distribution pattern at the Graduate I-Professional level for 1969-70 with that for 1980-81, the greatest relative gains are shown for the health professions (from 6.10 to 11.05 per cent) and for the applied social sciences and professions (34.53 to 37.36 per cent). The fields showing a drop in relative emphasis over the planning period are, in decreasing order of magnitude: humanities and communications (14.39 to 11.45 per cent), and physical sciences (6.58 to 4.80 per cent). Moderate declines in relative standing are shown for biological sciences and social sciences, while slight gains are shown

TABLE IV. URBANA-CHAMPAIGN CAMPUS: DISTRIBUTION OF GRADUATE AND PROFESSIONAL ENROLLMENTS BY BROAD AREAS OF STUDY — 1969-70 AND 1980-81

Educational Levels and Areas of Study	*1969-70*		*1980-81*	
	Number	*Per Cent*	*Number*	*Per Cent*
Graduate I — Professional				
Total Enrollment	4,724	100.00	7,600	100.00
I. Humanities and communications	680	14.39	870	11.45
II. Arts and environmental design	332	7.03	550	7.24
III. Biological sciences	150	3.18	230	3.03
IV. Agricultural sciences	129	2.73	225	2.96
V. Health professions	228	6.10	840	11.05
VI. Mathematical sciences	226	4.78	415	5.46
VII. Physical sciences	311	6.58	365	4.80
VIII. Engineering	378	8.00	670	8.82
IX. Social sciences	388	8.21	595	7.83
X. Applied social sciences and professions	1,631	34.53	2,840	37.36
XI. Special interdisciplinary programs	211*	4.47*	(225)**	(2.96)**
Graduate II				
Total Enrollment	4,604	100.00	7,200	100.00
I. Humanities and communications	686	14.90	985	13.68
II. Arts and environmental design	178	3.87	310	4.31
III. Biological sciences	259	5.63	470	6.53
IV. Agricultural sciences	216	4.69	350	4.86
V. Health professions	27	.59	60	.83
VI. Mathematical sciences	285	6.19	500	6.94
VII. Physical sciences	514	11.16	800	11.11
VIII. Engineering	502	10.90	1,220	16.94
IX. Social sciences	630	13.68	935	12.99
X. Applied social sciences and professions	1,143	24.83	1,570	21.81
XI. Special interdisciplinary programs	164*	3.56*	(400)**	(5.56)**

* The 1969-70 students classified in Area XI are graduate students who are not candidates for degrees. No enrollments of such students are projected for 1980-81.

** This number refers to projected enrollments in multidisciplinary programs to be administered by a proposed Environmental Studies Institute, whose students will be classified among the cooperating departments and colleges of several of the broad areas listed in this table.

for arts and environmental design, agricultural sciences, mathematical sciences, and engineering.

The category "applied social sciences and professions" includes four professional fields that are of particular importance to the campus and to state-wide planning: commerce and business administration, education, law, and social work. A breakdown of the enrollments in these fields for 1969-70 and the projections for 1980-81 is of special interest. The following figures show the enrollments for these two years and the percentage increases from 1969-70 to 1980-81:

			Increase	
Graduate I-Professional	*1969*	*1980*	*Number*	*Per Cent*
Commerce and business administration	194	475	281	145
Education	514	855	341	66
Law	618	1,015	397	64
Social work	75	175	100	133

In all cases, the percentage increases exceed those for the total enrollment at Graduate I-Professional level (which is 61 per cent). The projected increases for commerce and business administration and for social work are substantially higher than those for the other two fields in this professional group.

The distribution pattern for Graduate II enrollment is generally quite different from that for the Graduate I-Professional level — as inspection of the figures in Table IV will show. This is due partly to the fact that most of the enrollment in the postbaccalaureate *professional* curricula is classified as "Graduate I-Professional" (e.g., that in law, medicine, and veterinary medicine). (The enrollment at Graduate II level for these fields consists of students working towards various types of graduate degrees — mainly doctoral and master's degrees requiring longer than one academic year.)

In general, the greatest percentage change in the Graduate II pattern over the twelve-year period is for engineering — which is projected to increase its proportion of the campus total from 10.90 to 16.94 per cent. The other principal change indicated in Table IV involves the multidisciplinary field of environmental studies, whose enrollment will be reflected in that for the various supporting departments and colleges. The estimate of 400 students shown for 1980-81 in Category XI would represent 5.56 per cent of the campus total, which undoubtedly would be a substantial increase above the 1969-70 level. But the amount of gain cannot be estimated, since the number of students currently engaged in "environmental studies" is not available from existing registration records.

As already noted, the substantial increase in emphasis upon engineering assumes that the College of Engineering will change its orientation during the 1970's towards greater concentration upon problems related to the quality of the environment and to the interactional relationships between physical and social phenomena. This approach is discussed further in an example given in the next section.

Graduate II enrollment for 1980-81 also includes students who will be enrolled for a new doctorate in social work (not the Ph.D. degree), for the new degree of Doctor of Arts, and for such other "professional" doctorates as might be established.

DEVELOPMENT HIGHLIGHTS

The following are outstanding examples of the developments being planned for the Urbana-Champaign campus during the coming decade: (a) the initiation of medical education and the expansion of instructional and research programs in related fields; (b) a new institute for the coordination and expansion of graduate education and research related to environmental problems; (c) the improvement of undergraduate education; (d) innovation in doctoral education, including the development of professional doctorates both in disciplinary areas (a new teaching degree of Doctor of Arts) and in areas related to public services (social work, public health); (e) expansion of international studies; (f) applications of computer-based technology and systems analysis.

The Health Sciences and Professions. As already noted, the Urbana-Champaign campus is working with the College of Medicine at the Medical Center campus to establish a School of Basic Medical Sciences in Urbana-Champaign. The School is scheduled to admit a small pilot class of 10 students in September, 1971, to be increased to 32 in 1972-73. Additional facilities are planned which would permit a further expansion to 130 first-year students by September, 1974. This development is part of a far-reaching plan of reorganization of the College of Medicine under which the preclinical part of the M.D. curriculum will be concentrated into an intensive first year — to be followed by three years of clinical education in semiautonomous schools of clinical medicine. The plan will be described in some detail in the following chapter on the Medical Center campus.

Among other objectives, the introduction of medical education into a setting of university departments of biological and chemical sciences should lead to improved integration between the premedical and the medical curricula. Such integration, in turn, is designed to help shorten the overall period of medical education.

Students in the Urbana-Champaign School of Basic Medical Sciences will transfer to one or more of the College of Medicine's clinical schools for the completion of their M.D. training. It is expected, however, that clinical facilities adequate for an entering clinical class of 60 students (and a total of 172) would be available at the Urbana-Champaign campus by 1980. In that event, a separate school of clinical medicine would be established, with the operation both of this unit and of the School of Basic Medical Sciences becoming the responsibility of administrative officers and faculty at the Urbana-Champaign campus.

With the establishment of a full curriculum leading to the M.D. degree at the Urbana-Champaign campus, many collateral programs would be strengthened, and the medical program, in turn, would be strongly reinforced by the instructional and research activities in supporting areas. The work of the Environmental Studies Institute, for example, could be expanded by the inclusion of research and instruction related to environmental health that would not be possible without a medical school; and the training of medical students in community medicine and public health would be enhanced by the Institute's work. The medical school would profit greatly from existing teaching and research programs in various aspects of mental health, such as: clinical psychology, including the new curriculum leading to the professional degree of Doctor of Psychology; the Children's Research Center, an interdisciplinary facility for research on emotionally disturbed and mentally retarded children; the Adler Zone Center, a branch of the Illinois Department of Mental Health located adjacent to the Children's Research Center; the Speech and Hearing Clinic.

The establishment of the School of Basic Medical Sciences has already led to a grant of $600,000 from the Ford Foundation for research in reproductive physiology, to be conducted cooperatively by the Department of Animal Science in the College of Agriculture and the Department of Physiology and Biophysics in the College of Liberal Arts and Sciences. This program will be devoted primarily to basic research that is directly relevant to one of the most fundamental problems of our time, namely, population control.

The recently established doctoral program in the nutritional sciences, involving several departments in the Colleges of Agriculture and Liberal Arts and Sciences, will also benefit from the inauguration of medical education and associated research at the Urbana-Champaign campus.

Finally, these various developments should lead to the eventual establishment of a School of Public Health at the Urbana-Champaign campus with a program complementary to the one at the Medical Center campus. The two units would cooperate in sharing specialized faculty and research resources; but each would develop its own unique program suited to its regional setting and to the latter's special public-health needs.

Environmental Studies Institute. Although the Urbana-Champaign campus has very extensive programs of instruction and research in several colleges that are concerned with environmental studies, the need for a new organizational structure to provide focus and direction for these activities — and to encourage their expansion — has recently been recognized in a proposal for the establishment of an "Environmental Studies Institute," developed by a special planning committee. An institute instead of a special college was recommended partly because of the magnitude and variety of the University's present involvement in this field at the Urbana-Champaign campus. It seemed imperative that these resources be coordinated and effectively utilized in any new or expanded program in this area; and participation in the work of an interdisciplinary institute has appeared to be the most effective organizational means to this end.

The Institute will be more than a clearinghouse or coordinating agency; it would be responsible for the direction of graduate programs and for the organization of specialized task forces to conduct long-term studies of the physical, biological, and social environment of man. This kind of organizational structure is in accordance with a recommendation made in a report issued recently by the Office of Science and Technology (a White House agency) on the role of universities in the improvement of the quality of the environment.[7]

The Institute's program will be concerned both with the correction of undesirable conditions (e.g., pollution) and with the long-term evaluation of the social and technological development and planning for control of environmental quality. The figures included in Table XII indicate that by 1980 a total of 625 graduate students would be involved in the Institute's programs of graduate study. This would represent about 11 per cent of the total growth in graduate enrollment projected for the Urbana-Champaign campus between 1969-70 and 1980-81. These students would be enrolled in the following broad areas: arts and environmental design, biological sciences, agricultural sciences, physical sciences, engineering, social sciences.

Undergraduate Education. The University's growing responsibilities for instruction, research, and public service during the past twenty-five years have fallen most heavily upon the Urbana-Champaign campus. Hence, the latter has had the principal share of the difficulties cited in Chapter III as arising from insufficient faculty (and other) resources in relation to the widening public demand for educational services. Undergraduate education has been adversely affected as a consequence of these conditions, particularly at freshman-sophomore level.

The improvement of undergraduate instruction, therefore, will be one of the top-priority tasks at the Urbana-

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[7] Office of Science and Technology, *The Universities and Environmental Quality — Commitment to Problem Focused Education.* Superintendent of Documents, U.S. Government Printing Office, 1969.

Champaign campus during the next decade. Lower-division enrollment will henceforth be stabilized at its present level, and by 1980-81 there will be an increase of only 1,452 upper-division students above the 1969-70 figure (from 11,548 to 13,000, or a gain of 12.5 per cent). This virtual cessation of overall undergraduate growth will permit the campus to devote appropriate attention to the several important aspects of the undergraduate education that need improvement. These include faculty (especially the role of teaching assistants), curricula, teaching methods, evaluation procedures, and campus-wide administrative arrangements for planning, coordinating, and evaluating departmental and college programs. Particular attention will be given to the involvement of students in these tasks, and to the needs of special groups of undergraduates (for example, the educationally disadvantaged).

A major step towards the initiation of the new program for the improvement of undergraduate education was taken recently when the Chancellor at the Urbana-Champaign campus created a "Commission on Undergraduate Education and Life." The Commission will consist of students, faculty members, and administrative officers chosen to be widely representative of various constituencies at the campus. It has a broad mandate to propose improvements in all phases of undergraduate education — especially the freshman and sophomore years — as well as to recommend changes in housing regulations and other aspects of campus life.

Innovations in Doctoral Education. Reference has already been made to the Doctor of Arts degree, and this degree in economics was approved by the Board of Trustees in July 1970. It is expected to be the forerunner of similar programs in other fields designed to prepare candidates for careers in college teaching. It will be an alternative to the research-oriented Ph.D. degree, but will have equivalent scholarly requirements and standards. The regular course work and examinations will be essentially similar in the two programs — as the preliminary examination will be. But in lieu of the research dissertation required for the Ph.D. degree, students usually will be required to complete a program of laboratory training in teaching technology and an internship in teaching.

At present at the Urbana-Champaign campus, some ten doctoral degrees are awarded other than the Ph.D. degree: D.Art Ed. (art), D.B.A. (business administration), Ed.D. (education), D.L.S. (library science), J.S.D. (law), D.Mus.A (music), D.Mus.Ed. (music), D.Psych. (psychology), D.V.M. (veterinary medicine), J.D. (law). It is expected also that new professional doctorates in appropriate fields will be proposed during the next ten years — in addition to the degree of Doctor of Social Work now before the Board of Higher Education and the prospective M.D. degree discussed above. Public health and public administration are fields in which professional degrees are badly needed, and urban planning is another likely possibility.

International Studies. The University has developed extensive programs in international studies at the Urbana-Champaign campus during the past decade, and hopes to continue and expand these programs in the years ahead.

At present, there are five centers for the encouragement of graduate study and research in various areas: Asian Studies, International Comparative Studies, International Education and Research in Accounting, Latin-American Studies, and Russian and East European Studies. A Center for African Studies has been approved by the Board of Trustees, and will be submitted soon to the Board of Higher Education.

These centers are primarily coordinating agencies, which also seek funds for traineeships, library materials, and other special purposes. They have important roles in planning interdisciplinary curricula and cooperative studies.

The College of Agriculture has been especially imaginative in developing instructional programs related to its technical-assistance projects overseas, which are supported by the Agency for International Development. In many universities, AID projects have not provided much support to the regular educational and research programs of the campuses conducting them. But the University of Illinois has taken pioneering steps to show that this need not be the case. The on-going teaching and research interests of faculty members have been served by the overseas projects — particularly those in India — in ways that have been highly beneficial both to the University departments and to the overseas educational institutions being assisted.

Although domestic affairs in this country in recent years have tended to distract attention and divert support from international studies, it would be extremely unfortunate if these programs do not continue to receive the encouragement they deserve. The University will make every effort to maintain and improve the work of the several centers and the international program in agriculture. But increased federal funding is essential — especially to meet the costs of overseas study and research — and it is hoped that federal policy reducing funds for international programs can soon be reversed.

Applications of Computer-Based Technology and Systems Analysis. The University of Illinois has resources in computer science and technology at the Urbana-Champaign campus that probably are unsurpassed at any other university in the country. The Department of Computer Science, the Coordinated Science Laboratory in the College of Engineering, the Computer-Based Education Research Laboratory, Civil Engineering's systems program, the ILLIAC IV project, and the related Center for Advanced Computation — all these and other

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departmental programs utilizing computers provide the technical foundation for highly promising advances during the next decade in at least two major directions: (a) multidisciplinary investigation of complex environmental and social systems; (b) innovative applications in such areas as education, planning, administration, and the formulation of public policy. The following are three examples of such applications:

Coordination of Engineering and Social Sciences. It will be recalled that the projected distribution of Graduate II enrollment for 1980-81 among eleven broad areas of study showed a marked percentage increase for engineering over that field's proportion of the Urbana-Champaign campus' 1969-70 enrollment at this level. This proposed change rests upon two main premises: (a) that the College of Engineering will shift its emphasis substantially towards greater concern with the relationships between physical and social phenomena, between the world of technology and society; (b) that social scientists will join engineers and physical scientists in the study of these relationships, with a view to improving the quality of man's total environment and thus contributing to the development of a more humane society.

One of the principal agencies through which these multidisciplinary programs will be conducted is the Coordinated Science Laboratory of the College of Engineering. This Laboratory was established some twenty years ago primarily for research and development on electronic-computer control systems and related problems (its original name was "Control Systems Laboratory"). During the past decade, however, both the name and the mission of the Laboratory have been changed to reflect a broadening of interests beyond physical systems. Illustrations of the new orientation include the development of the PLATO system for computer-based education (now established in its own laboratory) and a "systems analysis" of the physical-economic-demographic development of an urban community.

Through the Coordinated Science Laboratory, the resources of various departments of the College of Engineering and those of several departments in other colleges will be directed towards multidisciplinary studies of interactions between man's physical and social environments. The methodology of systems analysis will be applied, for example, to problems in urban and regional planning — with the involvement of engineers, social scientists, professional planners, and officials concerned with the formulation of public policies and action programs.

ILLIAC IV Computer System. The computer system now under development at the Urbana-Champaign campus will provide a unique and powerful resource for the study of a wide range of complex problems that are not now amenable to adequate scientific analysis. These include numerical weather prediction, natural-resource allocation, large-scale agricultural planning (on a nation-wide or world-wide basis), and multidimensional hydrodynamic calculations. Using ILLIAC IV, a newly established Center for Advanced Computation will conduct multidisciplinary research on such problems, in cooperation with faculty members throughout the University and in other institutions.

Environmental studies, for example, involve a class of problems concerning the complex, interactive relationships between plants and animals (including man) and the environment. The rapidly increasing world-population pressures are generating an acute need for the identification of both qualitative and quantitative relationships, knowledge of which will permit the evolution of positive, rational techniques for management of our finite natural resources. Among the problems to be considered are: simulation of the photosynthesis and transpiration of cultivated plants, with important implications for agricultural production; the effects of periodic flooding on a complex plant population; simulation of the ecology of fish populations, in both inland lakes and ocean, a study in which account must be taken of climatological and predator-prey factors; and the problems of most direct interest, namely, human populations in their natural and artificial environments.

Computer-Based Education. The research and development program in educational technology conducted by the Computer-Based Education Research Laboratory and associated with the PLATO IV system, promises to be one of the most far-reaching breakthroughs yet achieved in educational technology. Now towards the end of a ten-year period of development and testing, arrangements are being planned for a large-scale pilot project involving elementary and secondary schools, and institutions of higher education. It is believed that both the technological properties of the system and the associated pedagogical innovations will lead to widespread utilization of the PLATO system, and hence to great improvement in the quality of education at lower cost in the areas of application.

The program of computer-based education associated with PLATO IV serves to illustrate the type of "public-service" contribution that only an educational institution such as the University of Illinois can make. But for the background of the University's interest and resources in computer technology and related engineering development, the emergence of the PLATO system would not have been possible.

Inquiries to the Long-Range Planning Newsletter may be directed to Anthony F. Graziano, 107 Coble Hall, Champaign. Telephone 333-4493.

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Long-Range Planning
FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

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AT URBANA-CHAMPAIGN

VOL. 2, NO. 1, OCTOBER, 1970

Report of Ad Hoc Committee on Environmental Science Program

The Urbana-Champaign campus has expressed its commitment to new and expanded programs devoted to teaching, research, and public service related to the quality of the environment. Last spring, a committee was appointed to consider how our campus can most effectively organize its activities in the environmental science areas. The committee has considered the need for the creation of a new organizational unit and has delivered a recommendation concerning the structure which should be developed together with the scope of the new unit's activities and its relation to other established units. This publication summarizes the considerations and recommendations of the Ad Hoc Committee on Environmental Science Program.

NEED FOR AN ENVIRONMENTAL STUDIES INSTITUTE

Environmental quality has become a national concern, a political issue, and the climate for establishment of an Environmental Studies Institute is favorable. Concern for environmental problems across the nation is reflected in the press and in the policies and budgetary priorities of the federal government. National laboratories are broadening their missions to include problems of environmental quality. Industry and agriculture, awakening to their responsibilities in maintenance and restoration of environmental quality, are looking to universities for answers to questions raised in assuming these responsibilities. And the faculty and students on this campus, as well as on every other campus, are vitally interested in the problem and in their university's playing a significant role in the search for solutions.

The University of Illinois has great strength in many areas of environmental studies, and throughout the campus first-rate programs exist dealing with various phases of environmental quality. Recognizing the crucial need to mount an all-encompassing effort to control the quality of the environment within which our society functions, the University has undertaken an intensive study of how our strengths can be integrated into an interdisciplinary effort of significant magnitude. Existing programs related to environmental studies are scattered and what is required, if we are to extend our competencies and breadth of activities, is a center which is identifiable both internally and externally to the campus. To fully marshall the intellectual resources of this University to meet the needs, faculty involvement in environmental sciences must be increased; and because such activity requires working together in interdisciplinary programs, there is a need to provide a unique organizational structure which will encourage and stimulate faculty participation. Some basic requirements for a successful interdisciplinary program have emerged from the experience of a variety of organizations, both here and elsewhere, which include the following:

1. **Commitment.** There must be a cadre of staff who, knowing that their professional development depends on the success or failure of the interdisciplinary program, are so fully committed to the interdisciplinary process that they are willing to make personal sacrifices when necessary for its success.
2. **Leadership.** Since it is hazardous to build entirely on the leadership of a single dynamic individual to activate any program, the leadership of an interdisciplinary program in particular must come from a significant number of persons to provide balance and continuity of effort.
3. **Focus.** While an interdisciplinary program should be so structured that it has sufficient breadth to be truly interdisciplinary, it must also have a focus to sustain interest in the project. It may accommodate a number of sub-projects, each of which may have a focal point of its own.
4. **Funding.** Many faculty members will be more likely to undertake a commitment to an interdisciplinary program if it offers opportunities that can not be had otherwise. Aggressive administrative support is needed for the procurement of funding which is flexible and continuing.
5. **Intellectual Climate.** Persons working on an interdisciplinary program need help from a variety of specialists in individual disciplines as well as the stimulation of contact with existing professional organizations. Only a major university provides this intellectual climate.
6. **Facilities.** It is crucial that the academic staff of an interdisciplinary team be provided with office, seminar, and laboratory space in close enough proximity to each other to promote personal contact. Although some

specialized laboratory facilities are required for such an interdisciplinary program as environmental studies, they are not too dissimilar from other laboratory facilities now on campus.

7. **Curriculum Control.** While some scientists prefer to engage entirely in research, most find the intellectual stimulation of the classroom necessary to their creative pursuits. If scientists are to be involved in teaching as part of an interdisciplinary program, they should have some control over the design of courses and curricula.
8. **Rewards.** To build an interdisciplinary team whose members possess the proper mix of expertise for the problems involved in environmental studies will require careful recruiting, sound promotion policies, and salaries that will encourage continued faculty commitment to the program.
9. **Service.** Members of an interdisciplinary team must not only bring the results of their environmental studies before the public through reports to leaders in industry, government, and private life but must also be willing to accept assignments as interns and consultants in areas of acute environmental stress and to serve on and advise government and industrial commissions and boards.

Although at this time there is on the Urbana-Champaign campus extensive commitment by a significant number of highly competent faculty to an environmental study program, it is the conclusion of the Ad Hoc Committee on the Environmental Science Program that a new organizational unit would greatly facilitate the development of an interdisciplinary program (including teaching, research, and public service) in the general area of environmental studies.

Among the guiding principles to be applied in establishing such a unit, three are of paramount importance:

1. The high academic standards of the University must be maintained.
2. The main core of activities of the existing academic departments and related special units of the University, as well as those of the State Geological Survey, the State Natural History Survey, and the State Water Survey, should not be impinged upon; rather, the new unit should broaden the opportunities open to all qualified members of both University and Survey staffs.
3. Duplication of existing programs must be avoided to permit the most efficient use of the state's economic resources.

Scope

The emphasis of the proposed Environmental Studies Institute will be on the physical, biological, and social environment of man, and how man affects and has affected his environment as an individual and as a group. The program will not only be concerned with the correction of undesirable conditions, such as pollution, created by man's misuse of natural resources but also with long-term evaluation of social and technological development in relation to control of environmental quality. For both environmental quality and social and technical development are essential to man's physical and mental health, his aesthetic enjoyment of his surroundings, and his economic well-being.

The educational program of the Institute will emphasize both graduate and undergraduate courses which integrate the principles involved in a holistic consideration of the environment with problem-solving experiences. The Institute should develop its own courses as needed. Indeed, it should be encouraged to innovate novel instructional arrangements in the educational program of the University through such devices as team instruction in interdisciplinary courses and in seminars. The Institute should also encourage the development of new, environmentally-oriented courses in appropriate departments of the University, as well as making use of existing courses and of cross listing courses. Enough of these courses should be offered to permit graduate students to minor in environmental studies. Sound programs leading to a graduate degree may ultimately be developed, but undergraduate degree programs are not recommended at this time.

The research program of the Institute will need to be supported by state funds in the internal budget of the University. While these funds may be largely augmented by contracts and grants, "hard money" is absolutely essential to keep the environmental studies program flexible, to give it continuity, and to develop young faculty.

A public service program, with perhaps some personnel especially devoted to this activity, would be organized and should include publishing as well as teaching. The public service function of the Institute would be especially important because of the social relevance of the environmental studies program. Public service should be conducted on two levels: (1) as a consulting service to federal, state, or local governmental units and (2) as a comprehensive program of public education through all communications media and by advice to individuals and citizen groups. Staff members of the Institute should serve as "teaching" contacts with citizens, community groups, and governmental agencies. Other Institute personnel should include editorial and publications experts whose function would be to translate the results of research so comprehensively that they would be effective in promoting the application of research results to control of environmental quality.

Structure

The Ad Hoc Committee on the Environmental Science Program considered many forms of organization — such as a coordinating center, an interdisciplinary or multidisciplinary laboratory, a school — for the new unit on environmental studies. But because an *institute* has the autonomy and other organizational framework needed such as, for example, the participation of the Agricultural Engineering and the Chemical Engineering programs in the College of Engineering while still being administered under the College of Agriculture and the College of Liberal Arts and Sciences, respectively.

Because the State Geological Survey, the State Natural History Survey, and the State Water Survey are deeply involved in environmental studies and are located on the Urbana-Champaign campus, it is imperative that the program of the Institute be closely coordinated with their missions. To accomplish this, the staffs of the Surveys can participate directly in the research activities of the Institute simply by incorporating Survey scientists into the Task Forces, as has been done for many years in many similar activities. Another method of participation would be the expanded use of joint appointments, for many joint appointments are now in operation between other units of the University and divisions of the Surveys.

Societal Relationships

The program of the Institute must always be directed to the best possible solution of problems of importance to society and must avoid short-sighted problem-solving for special interest groups. The Institute's extramural Advisory Board, its faculty and students serving on outside internships or work-study programs, its faculty on leave *to* government or industry, and its adjunct faculty appointed *from* government or industry will all provide contacts for societal input to the Institute program. Societal output will be developed through (1) high-level public services to local, state, and national citizens groups; (2) public education through reports, conferences, short courses, and communications media; and (3) the missions of students and faculty on assignment as interns in areas of environmental stress.

The Institute would not function as an enforcement agency in control of environmental quality. Nor would its activities include construction and operation of pollution-control facilities or the design and planning of control methods for specific environmental problems, except where such devices are needed to serve in teaching and in research. The mission of the Institute would be to expand and transfer knowledge of the environment to society, with emphasis on the use of that knowledge in solving environmental problems.

Development

Creation of an Institute with a program of environmental studies of this scope and complexity would require much diligent effort and time. It needs, on the one hand, to proceed with careful consideration and planning; but, on the other hand, the environmental problems confronting society will not wait until organization is perfected. It is therefore important that the University extend and expand without delay the many current activities leading to the development of the Environmental Studies Institute. Figures 1, 2, and 3 illustrate suggested stages of development.

It is recommended that an intramural Environmental Studies Council be appointed immediately (1) to oversee and coordinate existing and emerging Task Force activities; (2) to advise the Chancellor of the priorities for commitment of University funds, space, staff, and other resources to various environmental programs; and (3) to implement the recommendations of the Ad Hoc Committee on the Environmental Science Program for establishment of an Environmental Studies Institute, selection of a director, and establishment of seminars, courses, and curricula in environmental studies. In short, the Council would be responsible for running the environmental studies program until the Institute is established. To do this, the Council would need staff and funds. Once the Institute is created and a director appointed, the Council would then move to an advisory and coordinating role. The Council, to be appointed by the Chancellor in consultation with the deans and directors of the University's academic units, should be broadly representative, composed of persons of mature judgment and vision.

After establishment, the Institute could begin to evolve into its intermediate stage (see Figure 2). In this stage the director would assume responsibility for the existing Task Forces, with the Council continuing to serve the director in an advisory capacity until such time as an Institute faculty could be formed and an Executive Committee elected. The extramural Advisory Board should be appointed as early as possible, even before official establishment of the Institute, in order that its advice about the mission and plans of the Institute could be available from the outset. Ultimately, the program should then develop to the point that the Institute, in full operation, becomes the mature organization illustrated in Figure 3.

Inquiries to the Long-Range Planning Newsletter may be directed to Anthony F. Graziano, 107 Coble Hall, Champaign. Telephone 333-4493.

for development of an interdisciplinary program, and because an *institute* is structured to integrate its activities so flexibly with those of other on-campus schools, colleges, and laboratories — as well as the State Geological Survey, the State Natural History Survey, and the State Water Survey — the Committee recommends that the new environmental studies unit be organized as an Institute.

Organization

It is recommended that the chief administrative officer of the Institute will be a director who will report to the Office of the Chancellor and will function in a manner similar to that of a dean or a director of any other University unit. His selection should be subject to the recommendation of a duly-appointed search committee. His qualities of leadership, professional reputation, and administrative skill must be of the highest; and he must also have that catholicity of outlook so essential to the maintenance of a well-balanced interdisciplinary program.

The staff should consist of (1) a group of joint-appointment faculty whose part-time services in many different departments of the University will permit the very wide range of disciplinary representation and expertise needed by the Institute and (2) a small "core group" of full-time faculty who are so totally committed to the mission of the Institute that they will devote to it the very great effort required to initiate and sustain the thrust of its program. This second group is vital, for the Environmental Studies Institute can not possibly be developed as the spare-time effort of a joint-appointment faculty alone.

The Ad Hoc Committee on the Environmental Science Program therefore suggests that the faculty for the Environmental Studies Institute be assembled by (1) voluntary transfer of certain full-time faculty from other departments of the University to the Institute; (2) recruitment of new faculty for full-time appointment in the Institute; (3) joint appointment (part-time in another department of the University and part-time in the Institute); (4) "swinging" appointment (similar to joint appointment, except that the services of such faculty to the Institute would be on a temporary, as-needed basis); (5) appointment as associate faculty (distinguished faculty members of other departments of the University whose advisory relationship to the Institute would enhance its program); (6) appointment as adjunct faculty (recruitment of full- or part-time faculty, as needed, from industry, government, or community for the special expertise, experience, or insight they can contribute to the Institute).

The Director of the Institute would be assisted in the administration of its program by the advice of (1) a University "statutory" Executive Committee which is representative and has mechanisms for student input; (2) an intramural Advisory Council, representing various colleges and other units of the University, as well as the State Geological Survey, the State Natural History Survey, and the State Water Survey; and (3) an extramural Advisory Board, representing high-level advisers from government, industry, and the community, who would periodically review and assess the effectiveness of the Institute program.

Since the departmentalization of the Institute would be antithetical to the interdisciplinary concept of its program, the Ad Hoc Committee suggests that there be no departments. The basic interdisciplinary and multidisciplinary components or divisions of the Institute would be called "Task Forces." Each Task Force would provide the opportunity for a team of faculty members and students from a variety of disciplines to work together on solving such socially significant environmental problems, for example, as lead pollution, overcrowding in cities, population control, and other problems. And each Task Force would be organizationally patterned to best accommodate its particular mission and will, of course, vary in the number of faculty members and students it involves and in the length of time it is active.

Every Institute faculty member and student would be required to devote the major portion of his efforts to participation in one or more of the Task Forces. While an individual's performance as a Task Force member would be the basis for judging his professional development, a young faculty member would also be encouraged to conduct individual research on some aspect of his Task Force problem; and some established faculty members would almost certainly feel the need to explore important aspects of the environmental problems of their particular Task Force assignments on an individual basis. Budgets should, therefore, provide for some faculty released time for individual research, as well as funds for graduate assistants, supplies, travel, and so forth.

On-Campus Relationships

There will be need for certain University units to transfer some of their activities to the Environmental Studies Institute in order that it can establish a viable program without duplication of activities. There is also a great amount of activity in University units that will need to be coordinated with the Institute program. Two of the guiding principles cited previously were that, in establishing the Institute, current activities of existing departments would not be limited by establishment of this new unit and that duplication must be avoided. It is believed that, with compromise, these principles need not be contradictory. It is also recommended that those interdisciplinary units in the University whose function is relevant to the Institute program, for example, the Water Resources Center and the Center for Human Ecology, be transferred to and incorporated within the Institute. There will also be advantages in arranging for the participation of existing University units concerned with the environment in the program of the Institute while continuing to be administered under their present framework

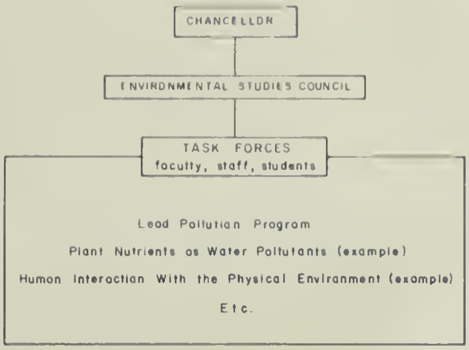
CHANCELLOR
ENVIRONMENTAL STUDIES COUNCIL
TASK FORCES
faculty, staff, students
Lead Pollution Program
Plant Nutrients as Water Pollutants (example)
Human Interaction With the Physical Environment (example)
Etc.

FIG I INITIAL STAGE OF PROPOSED ENVIRONMENTAL STUDIES INSTITUTE

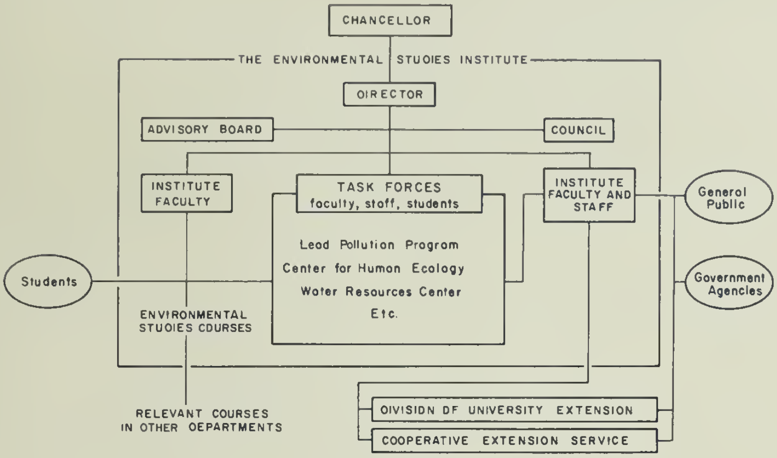

FIG. 2 INTERMEDIATE STAGE OF ENVIRONMENTAL STUDIES INSTITUTE

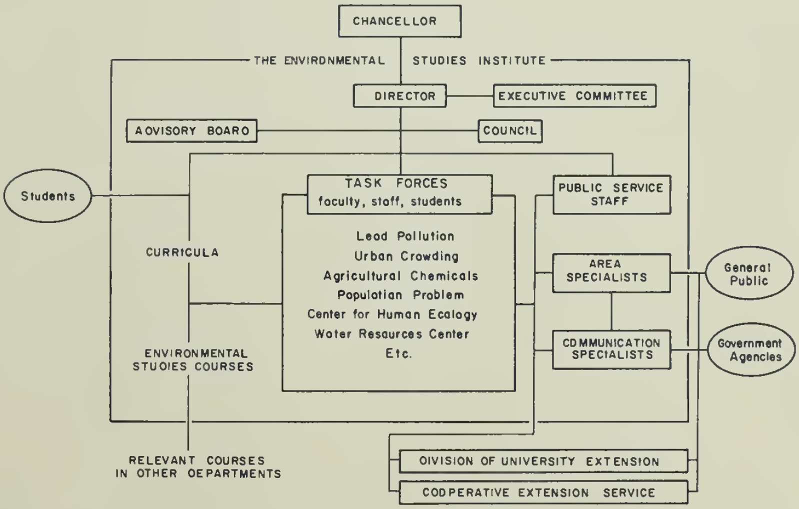

FIG. 3 ORGANIZATIONAL CHART OF ENVIRONMENTAL STUDIES INSTITUTE

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Long-Range Planning

FROM THE LONG-RANGE PLANNING COMMITTEE

University of Illinois at Urbana-Champaign

VOL. 1, NO. 6, MAY, 1970

Examination of the Decision to Increase Graduate Enrollment

Through the several probes which sampled faculty, department, and college opinions, it was discerned by the Long-Range Planning Committee that there exists a great desire to accept future enrollment growth of the Urbana-Champaign Campus at the graduate level. You are referred to the first of these long-range planning reports, dated October, 1969, and November, 1969, which communicated the results of the faculty questionnaire and the results of department, institute, and college reaction to the problem of future enrollment growth and size of the Urbana-Champaign Campus. Recent experience in the academic market place, recent changes in policies by which the necessary resources are supplied, and continued exposure to studies of future trends lead us to further examination of the implications involved in enlarging graduate enrollments.

At a recent National Conference on Higher Education, a paper was presented by Dr. Allan M. Cartter, Chancellor and Executive Vice President of New York University, which concisely presents some of the issues with which we must all be concerned. The remainder of this report presents that paper for your consideration.

THE AFTER EFFECTS OF PUTTING THE BLIND EYE TO THE TELESCOPE

Nearly six years ago I had the temerity to publish a small paper in the *Educational Record* entitled "A New Look at the Supply of College Teachers" that caused a ripple within a limited circle of educators concerned with the academic labor market. It was a backward look over the preceding decade, and it concluded that most of us in the mid-1960's were living in a mythical world of our own making. We were then all beating our breasts and proclaiming that the quality of our teaching faculties was rapidly deteriorating because of the growing teacher shortage, and that the chaos would fully overtake us by 1970. By contrast, I argued that we had all been brainwashed for fourteen years, and that in fact the world was improving, not grinding to a halt.

In 1966 I published projections for the coming decade that predicted an end to the "sellers market" for new Ph.D.'s by 1969, and a surplus of doctorates in most fields beginning in 1970. There were a few converts in the next several years, but it was the 1969 fall and winter meetings of the major professional societies that won me more bets than I care to collect. The national press stories about the job hunting shambles at the Modern Language Association meeting in Denver three months ago were sobering. An article in *Science* last November quoted leading chemists, physicists, and mathematicians, as bemoaning the lack of academic openings for their Ph.D. students. Some persons are still hopeful that current federal cut-backs have created a temporary imbalance and that next year all will be normal again. I must assure you that it will not. The shortage of Ph.D.'s that we have lived with for thirty years — with the brief exception of 1952-55 — is over. Barring a major war, in most major fields of study we will never experience it again.

For a decade colleges and universities each year have employed 50 per cent or more of the new Ph.D's. When 1970 ends the figure is likely to be between 35 per cent and 40 per cent. I doubt it will ever exceed 40 per cent again, and by the end of this decade only a quarter or less of new doctorates will enter college teaching. We are witnessing one of the most radical changes in the condition of higher education we have ever experienced, and it will have a major impact on the whole fabric of the academic world.

Such a dramatic change should also give us pause to reflect upon how little we know about ourselves — how little thought we have given to the development of our educational system, and how inaccurately we have cast our objectives and done our planning. No great powers of intuition or prophecy were required to see that the academic environment was about to change dramatically; all one really had to do — like Al Smith — was to look at the facts and not put the blind eye to the telescope.

The last ten years have been a euphoric period of growth — in enrollments, in federal support for research, facilities, and student aid, in state subventions, in academic salaries — we are now coming down to earth with a thud. The bull market is over, and I see little indication on the federal, state, or foundation front to suggest it will return soon. Like any other industry that has lived for years with 10 per cent growth rates and suddenly has to adjust to a more normal 2 per cent-3 per cent rate, we will find

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it difficult to adapt to this less exhilarating pace. As a result, to carry the economic analogy a step farther, our equivalent of capital goods industries — i.e., our graduate schools — may be entering a long period of overproduction and excess capacity.

The last frontier for rapid expansion (and one that may be popular enough politically to attract public support) is reflected by the advocates for open admissions. But at present rates of expansion, we will have exhausted that source of incremental growth within five to seven years in most states. Few of us are psychologically or institutionally prepared for living in a system that has reached physical maturity — it will require a severe readjustment in our outlook, and in the manner by which resources are allocated within the educational system.

When I began to write this paper, I did not intend to be quite so dramatic in my statements — and some of you will think I have greatly overstated the case. May I remind you of trends in several significant indicators of the system. The percentage of high school graduates who enter some type of formal post-secondary education was close to 25 per cent in 1940; by 1960 it had risen to 55 per cent, and today it exceeds 70 per cent. Graduating high school seniors are now about 82 per cent of the eighteen year olds, and a sizable fraction of them graduate only by virtue of serving out their time. Thus we have nearly exhausted rising college entry percentages as a source of expansion.

You may ask, won't the new influx of non-whites, who have been under-represented in college in the past, add significantly to total enrollments? Assuredly they will enlarge enrollments and raise the percentages attending college — but not significantly in the total system. If the same percentage of non-white high school graduates entered college as did whites, this year, total freshman enrollment might have been 50,000 greater (i.e., about 2½ per cent larger). Even in New York City, with its large Black and Puerto Rican population, the C.U.N.Y. open admission plan for this September is estimated to add about 5,000 students to the freshman class, less than a third of them non-white. Also we sometimes forget that in some parts of the country the Negro high school graduate has customarily entered college. For example, the 1960 census reported a higher proportion of Negroes than whites age eighteen to twenty-one in the city of Atlanta, attending college. Assuredly there are major problems of meeting financial needs of students from poor families and of assuring equitable access to all types of institutions, but the magnitude of the total system will not be drastically affected.

A greater potential impact on the size of the system might occur if there were a marked shift in the pattern of continuation in college. Over the last twenty years, the proportion of total college students in the first year of study has risen significantly, chiefly as the result of the growth of junior colleges. So far only a trickle of students has progressed from junior to senior institutions, but this is a potential source of growth. The California system is sometimes held up as a model in this regard, yet several years ago, when I last looked at California figures, they were quite discouraging. Only one in three who entered a junior college continued for a second year, and only about one in three of the returnees completed the two-year program. Of the latter who were in the college parallel track, about two-fifths continued their education in a senior institution. However, two-fifths of a third of one-third is a very small fraction (e.g., 4½ per cent). I see few signs of this pattern being significantly altered in the 1970's, for the limiting factors are individual motivation and aptitude, not structural obstacles.

The final, and most basic, factor which determines enrollments is the size of the college-age cohort. This total pool, whose growth rate has averaged 5½ per cent over the last seven years, will average only 2½ per cent a year increase in 1970-75, ½ per cent in 1975-80, and decline nearly 1 per cent a year in the early '80's. By 1985 the number of eighteen year olds will be 500,000 (12 per cent) below the 1978 level.

A declining rate of growth is not necessarily a bad thing — as individuals we experience it organically from about age ten on, we adjust to it intellectually after age twenty, and we adapt ourselves economically after age thirty. As a system of higher education, we are entering a period comparable to adolescence, with all the problems that entail.

The major stress and strain will be felt in the graduate schools, and by the young teaching aspirants receiving their doctorates. Let me illustrate. At the peak of expansion, 1964 and 1965, we needed to hire five teachers for every one that died or retired — that is, one as a replacement and four to meet growing enrollments. For the 1970-77 period this ratio will probably drop to 3:1; in the 1978-85 period it promises to be less than 2:1. The decrease in demand for college teachers is almost as dramatic in absolute terms. In 1964-65 we needed about 18,000 new college teachers just to meet expanding enrollments; for the next few years this need will average about 12,000 and, in all likelihood, it will decline to about 7,500 annually a decade from now. (A completely stationary system, quite obviously, would have a zero demand for expansion purposes.)

Last summer, in making the most recent revision of the college teacher projections, I predicted a hiring level for new college teachers of only 14,000 for 1970-71 — down from 17,500 last year and over 20,000 for the two preceding years. The estimate resulted from predicted increases in total enrollments of less than 200,000, as contrasted with the nearly half a million increments over the last five years. Indeed, the Office of Education reported in October that opening fall enrollment had increased by only 150,000 in 1969, the smallest increase since the Korean War. The impact on the academic labor market was strengthened by several extraneous factors, notably the cut-back in federal support for education and research, the tightening of state budget allotments to higher education (e.g., California, Louisiana), and the erosion of real dollar resources by inflation. In some fields the squeeze had been noticeable a year earlier; for example, the 1968 election resulted in the net departure of several hundred economists from federal agencies, adding significantly to the academic job seekers for 1969-70. In mathematics, and in some areas of engineering and physics, federal reductions in defense spending and R & D had begun to show up in the job market in 1969.

The Modern Language Association meeting in Denver three months ago saw an unprecedented number of job seekers pursuing a shrinking number of announced job openings. Several chairmen of major departments departed early after being literally hounded through the halls of the Hilton Hotel. At the close of the meeting a somewhat frenzied caucus of disappointed job aspirants and New Left literateurs presented a demand at the business meeting that university departments be taxed by M.L.A. to provide compensation for those not successful in finding employment. Doctoral candidates who several years earlier would have held out for Ivy League posts were quickly accepting offers from state colleges and emerging universities, and others with considerable scholarly promise were taking posts in previously unheard of junior colleges. It is understandable that a young Ph.D. with a specialty in eighteenth century Italian literature or the Victorian novel would feel more frenzied by a tight job market than an economist who might be equally at home in a bank or federal agency or an engineer who could practice his trade commercially.

Some of the effects of a shift in the academic labor market are healthy for the system, even though perhaps unpleasant for individuals aspiring to an academic career. Other effects are likely to be unpalatable on all counts. Let me briefly review several of these anticipated effects.

First, for fifteen years academic salary scales have been compressed. I can think of few other skilled occupations where the compensation of senior members is not relatively much greater than that of their junior associates. The average salary of full professors, reported by A.A.U.P. for 1968-69, was only 61 per cent higher than for assistant professors. Retiring full professors of better than average accomplishment in my University typically earn in their last year of employment about twice what the promising beginner earns. The range between the lowest and highest salaried full-time teacher with the terminal degree exceeds 3:1 in few institutions.

A recent survey of lifetime income paths for persons with the doctorate showed an approximate 2:1 ratio between beginning salary and peak income for academicians, 3:1 for similar persons with the doctorate employed in government, and 4:1 for Ph.D.'s in private business. Doctors, dentists, lawyers and similar professionals follow more in the government or business pattern, while academics have a pattern closer to social work, school teaching, and graduates of divinity schools.

For nearly two decades senior professors have experienced 4-5 per cent average salary increases, while assistant professors have been in the 7-10 per cent range. I would anticipate that the present shift in the academic labor market would tend to slow down overall increases, and shift the relative advantage to the senior professors. I believe this is a healthy shift, long overdue.

Second, academicians are less likely to be a race of twentieth century nomads under conditions of greater job scarcity. For the past fifteen years an individual's career has frequently been advanced by hopping from campus to campus, and tenure has declined in importance. A greater sense of faculty stability and institutional identification may reoccur as the result of market changes. Tenure decisions will probably be made more selectively in the future than has recently been the case, especially since a reduction in growth will tend to gradually increase the proportion of faculty in the senior ranks. These forces will dampen the opportunism of some faculty members, and the college teacher will have greater incentive to identify his well-being with that of his institution. A corollary of the expected decrease in mobility will be a greater tendency toward polarization if faculty do not feel they have an effective voice in the affairs of the institution.

Third, there is likely to be increasing pressure, both from junior faculty seeking tenure and from administrations attempting to keep instructional costs from rising, to lower the normal retirement age of faculty. Many institutions raised their retirement age to sixty-six or sixty-nine within the last decade because of the shortage of adequately trained faculty. Reversing the trend is difficult, for frequently senior faculty have planned their retirement based on current rules (or the practice in effect at the time of their employment). However, I believe there will be a concerted move in this direction over the next five years.

The more plentiful supply of faculty provides greater flexibility for institutions of higher education, but it occurs at a time when the financial squeeze restricts the ability of most colleges to avail themselves of this talent. From a strictly manpower viewpoint, for the first time in fifteen years there is now an opportunity to reduce student-staff ratios and reverse the trend towards larger classes. Financially, however, most institutions are being driven to find greater instructional economies. If anyone offered me a hundred newly minted Ph.D.'s of great scholarly promise at only $5,000 cash for next year, I would regretfully decline, for my task at the moment is to attempt to shrink our faculty by approximately 5 per cent in order to keep

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our deficit from soaring. Normal attrition in our case is nearly 7 per cent, but the next several years promise to be clearly subnormal in this respect.

It may seem ironic that just as we have reached a point where there will be sufficient numbers of highly qualified teachers to enrich the educational process, the growing financial pressures are going to force us to move in the reverse direction. Typical teaching loads around the country have declined by about one-third over the past fifteen years when faculty were scarce; now that there is a more abundant supply of well trained college teachers average teaching loads are likely to increase again. This is partly a market phenomenon — as new positions become relatively scarce, resistance to classroom assignments diminishes. Partly it is the result of a national choice to invest limited resources in broadening educational opportunities rather than enrichment for a more limited number. And perhaps most importantly it reflects growing pressures from students and the general public to counter what John Gardner characterized as new academic malady — the flight from teaching.

A new or rapidly expanding institution is in a most advantageous position today to attract better young faculty than it could have done in the recent past. Young growing institutions will have a better opportunity to develop quality programs and to move into the limelight in the 1970's than in the 1960's. States which have been slow to develop broad public systems of higher education in the past will have a comparatively easier time of it as far as manpower resources are concerned in the coming years.

Apart from junior college enrollments, the fastest growing sector in higher education for the last ten years has been the graduate schools. Events of the last twelve months, however, have markedly altered the outlook in advanced studies. Harvard and Yale have announced decisions to reduce graduate enrollments, and Princeton recently indicated that they, and several other Ivy League institutions, have found for two successive years that a declining percentage of their college seniors were going on to graduate and advanced professional education. It is hard to unravel the effect of the draft on such educational choices, but it seems increasingly likely that the rate of growth in graduate education will also diminish over the coming decade.

The graduate schools — most particularly in those doctoral areas devoted primarily to preparing college teachers — will be under the greatest stress and strain during the coming decade. The growing scarcity of good academic positions at the end of the Ph.D. line is bound to have severe psychological impact upon graduate students. Add to this the fact that increasingly the Ph.D. programs have been attracting bright students who are anti-establishmentarian in outlook, and it is apparent that the departments and graduate deans will have their hands full. Top this off with diminishing fellowship and research support, plus the headaches of adjusting to declining enrollments in some universities, and I foresee Association of Graduate Schools meetings being one long tale of woe during the 1970's.

Let me complete this look into the future by underlining one concern referred to earlier. I suggested that we have lived so long in a period of rapid growth that we are ill-prepared to adjust to the more stationary condition of 1975-85. My deepest concern lies with the states and their planning procedures. Many of those responsible for planning the future believe that higher education will follow the same course the high schools followed over the past generation, and that ten years from now we will have something close to 75 per cent of the age group in college. I believe all the evidence provided by the young today is counter to this view. I take the revolt against the materialist society more seriously than do some. With the movement towards a voting age of eighteen, the demands for earlier emancipation, the disenchantment with the established world symbolized (but not necessarily caused) by the spreading drug culture, there is growing evidence of rebellion against the collegiate formal educational process and the standard degree pattern. Dropping out — and intermittently dropping in again — may become a much more common occurrence. Nor do I think that is necessarily an undesirable pattern, for so many students are present in college today under real or imagined duress that the educational process suffers immeasurably.

In short, I believe there is a real danger that expansion-minded state-planning agencies may over-build the state systems of higher education by the middle or late 1970's. As we approach that danger point, a substantial portion of the private sector will be in a losing battle for survival. Only those private institutions who provide an educational experience believed to be far superior to the public institutions are likely to survive in a world with more places open than there are students. It is true that the decade of the 1990's, with its again enlarged college-age cohort, may save us — but it could be ten years too late for many private colleges and universities.

The 1970's are going to be a period of radical adjustment for higher education — I hope we are prepared to be sufficiently radical to cope with the challenges.

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Long-Range Planning

FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

VOL. 1, NO. 5, MARCH, 1970

Implications of Future Growth at the Advanced Graduate Student Level (G_{II})

The following information is being presented in order to provide the faculty with a quantitative feeling for the size and complexity of the funding of our graduate programs in the present and in the future.

Based upon the Long-Range Planning Supportive Study IV (Selected Resources Applied to Generate a Student Credit Hour), total campus expenditures at the advanced graduate (G_{II}) level for the year 1967-68 amounted to 34.2 million dollars at the departmental level of expenditure. Each department has been provided with its own portion of this analysis. This figure was arrived at essentially by distributing all departmental expenditures for instruction, research, and administration to each student level of instruction. The distribution was based primarily upon relative faculty effort distributed to each level of instruction as reported in the statistical reports for that year. Adding allocated campus level costs to this figure generates a total campus level expenditure at the G_{II} level of 52.7 million dollars:

Departmental Level Expenditures	$34.2 million
Fellowships	4.6
College Overhead	1.4
General University Support	7.2
Library Costs	1.4
Physical Plant Costs	3.9
Total	$52.7 million

Assuming a full-time equivalent (FTE) G_{II} student takes the equivalent of thirty-six semester credit hours (nine graduate hours) of coursework and thesis work over a twelve-month period, the *annual* (twelve-month) cost per FTE G_{II} student in 1967-68 amounted to $11,175 ($305 per semester credit hour) at the departmental level and $17,260 ($471 per semester credit hour) at the all-campus level.

From campus records and from Long-Range Planning Committee negotiations with each college, our total G_{II} headcount enrollments for the immediate past and for the projected future are:

Fall Semester of	*1967*	*1968*	*1969*	*1970*	*1972*	*1974*	*1980*
Headcount G_{II}	4216	4451	4604	4800	5625	6300	8200
FTE G_{II}	3054	3296	3400	3600	4200	4700	6100

Assuming that the educational process and costs at the G_{II} level do not change, using the 1967-68 cost figures and accounting for no inflation, the corresponding G_{II} costs for these years might be:

Fiscal Year	*1967*	*1968*	*1969*	*1970*	*1972*	*1974*	*1980*
Total G_{II} Cost, Departmental Level (Millions of Dollars)	34.2	36.8	38.0	40.3	46.9	52.5	68.2
Total G_{II} Cost, Campus Level (Millions of Dollars)	52.7	56.9	58.7	62.1	72.5	81.1	105.2

This analysis is by no means a precise measure of G_{II} costs, but it does present "ball park" figures based upon our costs for 1967-68.

To better understand the overall impact of restricted funding (non-state funds) upon our system, you need only consider the implications of the following table:

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[redacted]

G_{II} COSTS PER FULL-TIME EQUIVALENT G_{II} TAUGHT, 1967-68

(Based on 1967-68 report of resources applied to generate a student credit hour — does not account for future inflation)

	Departmental Level Costs	*Total Campus Level Costs*	*Departmental Level Costs from Restricted Funds*	*Per Cent Restricted Funds (Non-State Funds) Departmental Level*
All Campus	$11,175	$17,260	$ 7,015	63
Agriculture*	28,695	39,615	12,910	45
Commerce	3,370	7,730	480	14
Education	7,550	12,640	4,635	61
Engineering	23,490	34,995	18,835	80
Fine and Applied Arts	5,715	10,665	1,245	22
Liberal Arts and Sciences	7,330	12,825	4,305	59
Physical Education	3,885	8,025	1,205	31

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*Includes Agricultural Experiment Station, which has less direct connection with graduate instruction than organized research in other colleges.

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Long-Range Planning
FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

VOL. 1, NO. 4, FEBRUARY, 1970

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Organizing for Continuous Planning

A PROPOSED BUDGETING AND PLANNING RELATIONSHIP

The current budgeting system of the Urbana-Champaign campus is responsive rather than anticipatory. Aside from funding for new programs and major improvements, most operating allocations are made on the basis of increased enrollments that have been experienced the previous year. Under this budgeting system, a teaching unit must carry increased teaching loads for at least one year before relief in the form of new teaching positions is forthcoming. Thus, funds for our staffing resource are allocated only after a demonstrated need has arisen. Similarly, expansion on the campus occurs principally in response to existing deficits in space allocation; and the construction of new buildings proceeds from priorities developed out of documented space needs. The space lag now inherent in our system is such that an operating unit and staff must experience and live with serious space shortage and resultant inconvenience to its educational programs before new space can be justified and assigned.

This budgeting system was developed during the era in which the University was committed to relatively unrestricted growth without a specifically stated program direction. Since the system is primarily designed to fill departmental needs after those needs are firmly established, little or no opportunity exists in such a system for investment in a future defined by a well-developed set of goals and objectives.

The current budgetary system helps to perpetuate the following problem situations:

1. It stifles the interest of department members in developing new and original programs, for unless the department can get funds under the new-program category of the University's budgetary request, it experiences great difficulty in pooling the funds for initial "start-up" costs associated with the introduction of a new program. The department's only alternative is to incur a high IU/FTE campus teaching ratio for at least one year to demonstrate the actual need for more teaching staff to support the new program.
2. It uses as the guide for assigning increased enrollment funds to a department the IU/FTE campus teaching ratio for the past year as compared to the ratio for previous years. If the ratio for a particular department was not appropriate when data collection first started or if the academic program of the department changed so that the ratio is no longer appropriate, the department must argue for special consideration which can not always be accommodated.
3. It has formerly assigned to a particular department the funds and positions which in past years have become a permanent part of that department's budget with no effective mechanism for changing those assignments to meet major shifts in current or future college needs. The newly established position-control policy, which states that all vacant departmental positions will be transferred to the budget of the college in control of that department for reallocation, does give the college some flexibility in reassignment of positions and funds from one area to another. However, unless the colleges strengthen their educational planning structures, definitely look to the future, and are willing to shift resources from one department to another or from one program to another, the flexibility which could be provided by the position-control policy will not be realized.
4. It annually calls on departments to present ideas for new programs. In many instances educational planning at the departmental level is not an organized, ongoing process, but is instead a response to that call. And in many instances new programs that are proposed to meet the budgetary deadlines are not new at all but are merely requests for small additions to current programs. When one considers, however, that few of the departments have ever had a new program funded through this process, it is not too difficult to understand the lack of enthusiasm when the call for such programs goes out.

In an attempt to achieve a meaningful relationship between the budgeting and planning functions of administrative units, the following recommendations are proposed:

1. Each department should establish a planning committee for continual review and examination of its goals and achievements. Ideas for new programs could then be forwarded to the respective colleges

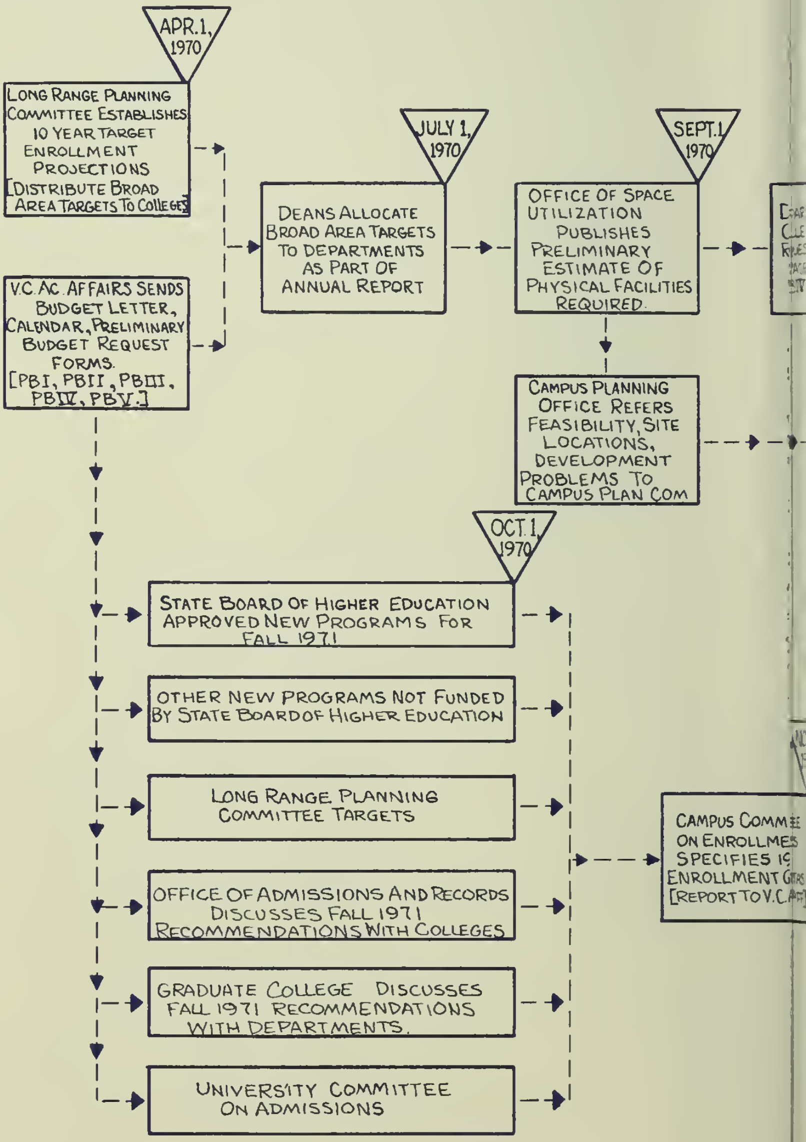
on a semi-annual basis, thereby providing a channel for systematic and periodic review by the college administration. Since the University's current strength exists because of past departmental entrepreneurship, it would seem logical to capitalize on it. The department's budgeting-planning process should be continual and active, not simply an annual updating of last year's requests and reports.

2. Each college should establish a planning committee for continual review and examination of its goals and achievements. This committee would be responsible for periodic review of all proposals received from departmental committees. The college committee would develop a coordinated college proposal to be forwarded to the Vice Chancellor for Academic Affairs on a semi-annual or annual basis. Recommendations from the college committee should, of course, cut across departmental lines; and, when applicable, the college may even propose programs that have been discussed and coordinated with other colleges. In this manner interdisciplinary efforts would evolve from the grass roots.

3. Colleges should explore all possibilities for initiating new programs by reallocation of their own resources, with little or no help from the campus administration. When the new position-control policy is fully utilized, each college has the power to direct its destiny on its own or with only partial assistance from the Vice Chancellor for Academic Affairs. Changes in educational programs need not be so dependent on new-program money from the state of Illinois if the resources presently available are effectively put to use. If the Vice Chancellor were to receive proposals from the various colleges on a semi-annual basis, however, he would be better informed and prepared to direct the academic program of the campus. The Long-Range Planning Committee for the Urbana-Champaign campus would provide him with the guidelines and program priorities that would best define the goals to be achieved through the budgetary process, these guidelines having been derived from and communicated back to the University community. The annual report of the Committee will represent the very best of the programs, ideas, and objectives, or combinations of those components, that have filtered up to the Vice Chancellor from the departments and colleges. It will also provide the departments and colleges with a picture of just where the University is going and will furnish them with an excellent tool for guiding their planning in the coming year.

Planning committees at the department and college level should serve as incubators for new program ideas and reform; they should screen and put in order the priorities of their respective faculties; they should evolve solutions to their particular problems within the limits of existing resources whenever possible; and they should foster imaginative responses to the changing needs of the times. A continuing program of study and analysis will be provided by personnel in the staff offices responsible to the Vice Chancellor for Academic Affairs in an effort to determine performance characteristics against which a department and college can measure its progress toward stated goals and objectives. An initial requirement for enlightened and effective unit-by-unit participation in overall campus planning is a systematic approach to the make-up of the annual operating budget and capital budget for the Urbana-Champaign campus.

The chart blocks out the proposed relationship between the various planning segments of the campus. The annual planning-budgeting cycle will involve a somewhat complex relationship, a system of checks and balances to be coordinated by the Office of the Vice Chancellor for Academic Affairs.


APR. 1, 1970
Long Range Planning Committee Establishes 10 Year Target Enrollment Projections [Distribute Broad Area Targets To Colleges]
V.C. Ac. Affairs Sends Budget Letter, Calendar, Preliminary Budget Request Forms. [PBI, PBII, PBIII, PBIV, PBV.]
JULY 1, 1970
Deans Allocate Broad Area Targets To Departments As Part Of Annual Report
SEPT. 1, 1970
Office Of Space Utilization Publishes Preliminary Estimate Of Physical Facilities Required.
Campus Planning Office Refers Feasibility, Site Locations, Development Problems To Campus Plan Com
OCT. 1, 1970
State Board Of Higher Education Approved New Programs For Fall 1971
Other New Programs Not Funded By State Board Of Higher Education
Long Range Planning Committee Targets
Office Of Admissions And Records Discusses Fall 1971 Recommendations With Colleges
Graduate College Discusses Fall 1971 Recommendations With Departments.
University Committee On Admissions
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[Report To V.C.

In the process that involves the formulation of the capital budget of the Urbana-Champaign campus, the Vice Chancellor for Academic Affairs is assisted by the Office of Space Utilization and the Campus Planning Office. These staff offices are responsible for the analysis of projected space needs and projected land utilization derived from long-range enrollment *targets*. The principal document used to measure these needs is the *Annual Preliminary Estimate of Physical Facilities Required.*

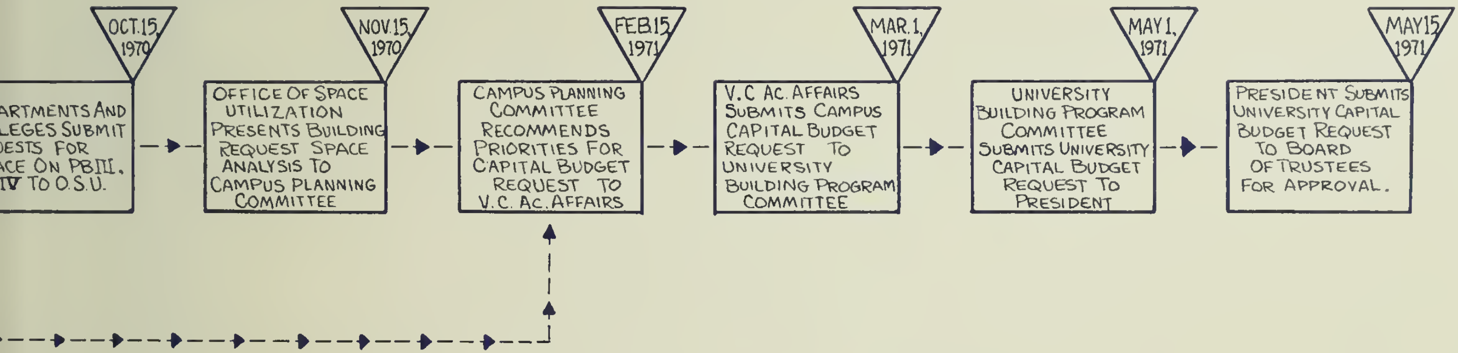
In the process that involves the formulation of the operating budget of the Urbana-Champaign campus, the Vice Chancellor for Academic Affairs is assisted by the Office of Administrative Studies. The personnel of this staff office is responsible for the analysis of projected operating budget requirements derived from enrollment quotas established for the following fall. The principal document used to measure these needs is the *Annual Preliminary Budget Analysis.*

Both budget processes involve faculty-student participation through the following standing advisory committees:

1. The *Long-Range Planning Committee for the Urbana-Champaign Campus* sets the long-range target enrollments that precede the formulation of the capital budget. The broad responsibilities of the Committee involve all aspects of establishing future objectives, as well as the means to achieve these objectives. The Committee's function includes analysis of present and future conditions for the pursuit of overall quality and excellence of the educational enterprise on the campus. Its deliberations and recommendations are necessarily expressed in quantitative long-range targets, but these targets represent decisions based on thorough academic analysis and examination.
2. The *Campus Planning Committee* is assigned the

CAPITAL BUDGET PROCESS

TO ESTABLISH BUILDING PRIORITIES



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MAR.1, 1971
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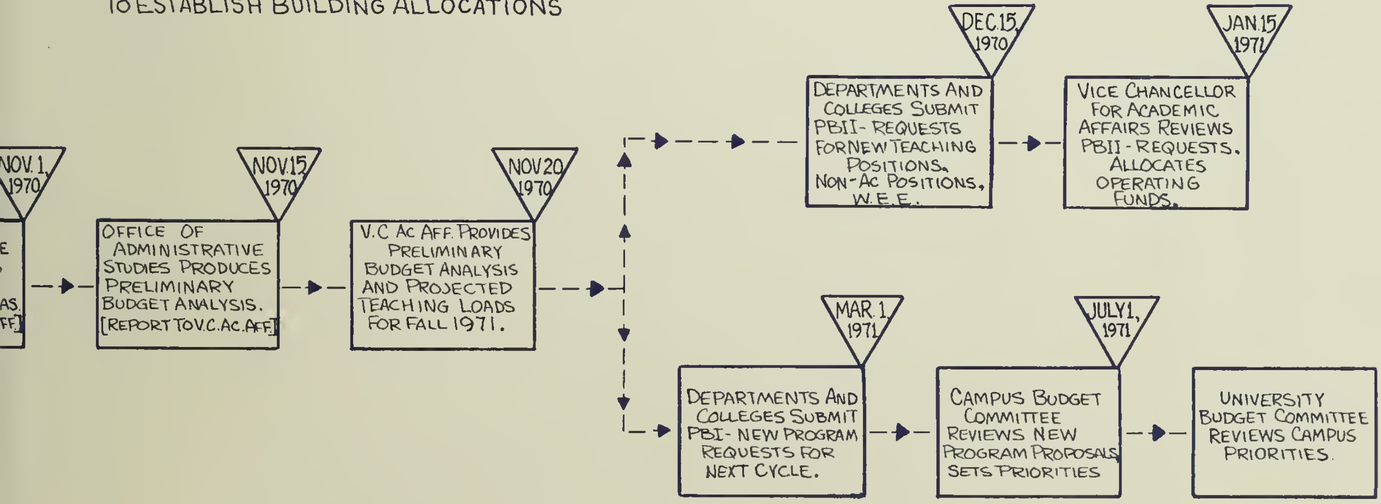
MAY 15 1971
ARTMENTS AND LEGES SUBMIT ESTS FOR ICE ON PBIII. IV TO O.S.U.
OFFICE OF SPACE UTILIZATION PRESENTS BUILDING REQUEST SPACE ANALYSIS TO CAMPUS PLANNING COMMITTEE
CAMPUS PLANNING COMMITTEE RECOMMENDS PRIORITIES FOR CAPITAL BUDGET REQUEST TO V.C. AC. AFFAIRS
V.C AC. AFFAIRS SUBMITS CAMPUS CAPITAL BUDGET REQUEST TO UNIVERSITY BUILDING PROGRAM COMMITTEE
UNIVERSITY BUILDING PROGRAM COMMITTEE SUBMITS UNIVERSITY CAPITAL BUDGET REQUEST TO PRESIDENT
PRESIDENT SUBMITS UNIVERSITY CAPITAL BUDGET REQUEST TO BOARD OF TRUSTEES FOR APPROVAL.

OPERATING BUDGET PROCESS

TO ESTABLISH BUILDING ALLOCATIONS



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JULY 1, 1971
DEPARTMENTS AND COLLEGES SUBMIT PBII- REQUESTS FOR NEW TEACHING POSITIONS, NON-AC POSITIONS, W.E.E.
VICE CHANCELLOR FOR ACADEMIC AFFAIRS REVIEWS PBII-REQUESTS, ALLOCATES OPERATING FUNDS.
OFFICE OF ADMINISTRATIVE STUDIES PRODUCES PRELIMINARY BUDGET ANALYSIS. [REPORT TO V.C.AC.AFF.]
V.C AC AFF. PROVIDES PRELIMINARY BUDGET ANALYSIS AND PROJECTED TEACHING LOADS FOR FALL 1971.
DEPARTMENTS AND COLLEGES SUBMIT PBI- NEW PROGRAM REQUESTS FOR NEXT CYCLE.
CAMPUS BUDGET COMMITTEE REVIEWS NEW PROGRAM PROPOSALS SETS PRIORITIES
UNIVERSITY BUDGET COMMITTEE REVIEWS CAMPUS PRIORITIES.

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responsibility for the orderly physical development of the campus to meet existing and future needs of the educational mission. The essential function performed by this Committee is the marshaling of physical facilities in such a way as to anticipate and meet enrollment pressures and organizational needs. Its deliberations are formulated as a recommendation for building priorities and as a policy for the physical expansion and aesthetics of the campus.

3. The *Campus Committee on Enrollments* initiates the operating budget procedure by setting enrollment quotas for the following fall. This Committee reviews and considers all factors influencing the enrollment of students — including initiation of new programs, long-range enrollment targets, recommendations of the Office of Admissions and Records concerning undergraduate enrollments by college, recommendations of the Graduate College concerning graduate enrollments by department, and recommendations of the University Senate Committee on Admissions. From these recommendations, the Committee on Enrollments advises the Vice Chancellor concerning the total enrollment quotas to be admitted in the fall of the following year.

College and department input precedes all the faculty-student committee deliberations described in the foregoing. The long-range enrollment targets are established within broad areas of study to assure the overall development of the educational mission in a manner that preserves the unique comprehensiveness of the Urbana-Champaign campus and that best serves the public. Each major unit is responsible for the order of its particular priorities in building and remodeling, new programs, and increased teaching loads.

There are two documents designed to create the necessary communication between each operating unit and the Vice Chancellor for Academic Affairs on the Urbana-Champaign campus:

1. The Vice Chancellor's budget letter, which initiates the annual planning-budgeting cycle, provides planning guidelines in the form of campus priorities. The budget package forwarded with the Vice Chancellor's letter consists of preliminary budget request forms (PB I-V) designed to assist each operating unit in evaluating the future resource requirements of its particular capital and operating priorities.
2. The annual report currently required of all units will contain the distribution of broad area enrollment targets to departments; it will contain an updated statement of the goals and objectives of the units; it will measure the accomplishments of the preceding year; and it will contain an explicit statement of educational program priorities.

Aside from the creation of college and department planning committees where none existed before, the proposed budgeting and planning system has been designed to utilize existing procedures and committees. It provides for continuous planning by the campus and each of its units. It attempts to provide the necessary time required for decision making based on sound prior analysis. Most significantly, the proposed planning-budgeting procedure provides the means to allocate resources to programs in a manner that anticipates controlled enrollment of students.

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Long-Range Planning

FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

VOL. I, NO. 3, DECEMBER, 1969

Interdisciplinary Centers: Role and Structure

INTRODUCTION

The assessment of our future educational objectives would be far from complete if we omitted the multiplication of "centers" which this campus has seen since 1950, for their establishment has reinforced much of the intellectual vitality within our present scene.

At Urbana-Champaign, the word "center" is not used normally to denote an independent department or faculty; it refers rather to an administrative device for assembling scholars from different disciplines and departments around a shared interest. Centers are means for facilitating interdisciplinary assaults on complex fields of investigation. The first of the kind at Illinois was the Digital Computer Laboratory established in 1948. But the growth of centers here in recent years speaks volumes both about the dynamism of the present quest in the University for new knowledge and about the manner in which this quest is now pursued increasingly in areas which fall outside the traditional boundaries of earlier delimited fields of study.

The interdisciplinary center has become a marked feature of the university landscape since World War II. This has come about in part because the evolution of man's search for knowledge has required greater interaction among the traditional disciplines. But also, society is increasingly placing demands upon the universities that the conventional departmental or disciplinary structure has seemed incapable of meeting.

There is no doubt that relations between conventional departments and centers can be uneasy ones in consequence of divided loyalties, problems of recognition and reward, and the like. Most universities today can present interesting exhibitions of undernourished centers that have not achieved anything. In many instances the center has been used as a device to obtain funds or to satisfy the particular concerns of an individual faculty member. Unless there is a well defined identification of purpose, able direction, a dedication to the mission of the center by a critical mass of faculty, and substantial administrative and faculty support, a center is unlikely to prosper.

Nevertheless, in spite of many obvious failures, centers are likely to remain a fixed part of the university landscape until long after 1980. It seems unlikely that the traditional discipline-oriented departments will produce the answers to questions which the public now demands universities answer. It appears that massive new impetus for the formation of centers is already being generated. The report (dated August 3, 1969) of the Special Commission on the Social Sciences of the National Science Foundation has proposed an initial ten million dollar program to establish a series of "social problem research institutes," possibly on university campuses.

The 1970 budget request of the National Science Foundation includes a proposal for another ten million dollars in support of "interdisciplinary research relevant to problems of our society" at our universities. There is some question as to whether or not these undertakings should be conducted on or off university campuses; but it seems certain that at least some of them will be on campus.

Certainly we should be prepared for undertakings of an interdisciplinary sort that are far more imposing and complex than anything we are so far acquainted with. There will be profound implications for budgeting, conventional notions of departmental roles, and traditional administrative alignments. The course of such developments is difficult to predict in any detail, much less schedule and program. But some general observations can be made.

TYPES OF CENTERS

The term "center" has come to have many applications in the contemporary university; but to the extent that it has some common designation it refers to any administrative agency (which may be labelled a center, an institute, a laboratory, or even an office) that brings together a variety of different agencies, or in the case of the interdisciplinary center a number of persons with different specialties or expertise, to work on a problem or mission.

The problem or mission may be very specific or quite broad and it may or may not require extensive physical facilities. Furthermore, the organization of a center ranges from those which have their own interdisciplinary professional staff engaged in little or no teaching of any kind to those which simply administer educational or graduate research programs which are strongly coupled with and staffed by faculty and other personnel from a variety of individual departments.

The diversity of "centers" is suggested by the following listing of such activities on our campus:

Those with independent physical facilities

- Atmospheric Science Laboratory
- Computer-Based Education Research Laboratory
- Computer Services
- Coordinated Science Laboratory
- Materials Research Laboratory
- Zoonoses Research

Those without major independent facilities

- Asian Studies
- Center for Advanced Study
- Comparative Psycholinguistics
- Curriculum Laboratory
- Human Ecology
- Institute of Communications Research
- International Comparative Studies
- Latin-American Studies
- Russian and East European Studies

Important to this area of consideration is the distinction between an "interdisciplinary center" and a "multidisciplinary center or facility." These terms are often used interchangeably, but it is better to distinguish between them. In the "interdisciplinary center," a prime focus of the program is the assembly of groups or teams of people from different departments to seek solutions to problems which call for the insights of experts in a number of disciplines. It is the problem which determines which people are to be involved. At the Coordinated Science Laboratory, for example, engineers and scientists with different fields of specialization have been involved in the design of components for a ship's navigation system, an air traffic control system, and a computer-based education system. In each case, a set of special disciplinary backgrounds or skills was needed, but the needs might vary for the different problems.

A multidisciplinary center or laboratory is one in which individual scholars from different disciplines (and departments) may share common research approaches, either experimental or theoretical. Thus, a metallurgist, a solid-state physicist, and a solid-state chemist may benefit by sharing both the experimental facilities and the intellectual environment of a laboratory like the Materials Research Laboratory. However, the problems tackled by a given scientist lie primarily within his own discipline and typically do not require others to participate in reaching a solution; the individual researcher benefits from the shared environment, intellectual stimulus, and physical facilities.

From the above descriptions, it should be evident that the roles as well as the make-up of the two types of laboratories are typically quite different. In the former case, it often can not be anticipated *a priori* which departments may become involved. For example, in a recent Coordinated Science Laboratory project a physicist and an urban planner joined in a program which originated as a transportation problem. By contrast, in a multidisciplinary facility, one may operate on the basis of serving a set of previously specified clients: thus a reactor or an integrated circuitry facility may anticipate the principal departmental users and be governed accordingly.

THE RELEVANCE OF CENTERS TO CAMPUS OBJECTIVES

It is our opinion that involvement in the solution of real problems is good for the university. The reasons are both philosophical and pragmatic; they are inherent in the traditions of American higher education, particularly those of the land-grant universities. Two basic assumptions of the land-grant movement were (1) that we should provide a first-rate higher education to a large and increasing fraction of our population, and (2) that our universities should assume an important role in the public service. Some of the unique qualities of American universities at their best are attributable to these society-oriented objectives.

We also argue for a strong interface between the university and society on purely pragmatic grounds. It was the commitment to public service and the solution of human problems, largely in agriculture, which helped to retain the grass-root support of the people of this state for their land-grant institution during its first hundred years and made it possible to build a major university on the Illinois prairie. The need for support and understanding at the national level is also essential. If we are to continue to receive massive federal support for graduate education and research, it is essential that we develop a better interface between our mission-oriented society and the discipline-oriented university.

Confronted with the question of how to relate to the problems of society, most university communities can respond in a multiplicity of ways that will reflect the interests and aspirations of its individual faculty. There is clearly no single response that should dominate the thinking of this or any university on these topics. Action programs, research projects, and involvement in the political arena are some of the ways which people can participate in social-oriented programs. The question is not which of many is best, but rather how can each be made effective. No discipline has a privileged view of society's problems. Each can contribute in a unique way. We must look for new and exciting ways of working together, thereby contributing in a way that is impossible if we insist on working alone. There is no lack of talent on this campus for developing a variety of programs that can relate to the problems of society.

As we plan for the 70's, we are persuaded that the need for training applied researchers will be relatively far greater than in the past, and that the nature of their training will of necessity be problem-oriented. We expect to see in the social sciences greater concern for applied research as well as for quantitative methodologies. The applied problems of the future will be more interdisciplinary in character, so it will be increasingly important to us at the University to learn how to organize and to administer interdisciplinary programs.

CREATION AND STRUCTURE OF CENTERS

It is true that the university finds it difficult to adapt its form to the new functions demanded by a modern technological society. It will be a continuing challenge to provide an administrative as well as cultural adaptation. To overcome the internal difficulties of fitting mission-oriented functions within the traditional forms of the university will certainly call for a continuing supply of uniquely talented scientist-engineers with a flair for administration, and to elevate administration to a respectable role in the university. We will have to do considerable soul-searching before we have faced up to these challenges. Centers as a response to such challenges should be created only where a very clear need can be demonstrated. The basic administrative unit of the University is the department, and the strength of academic departments should be promoted to the greatest possible extent. Interdisciplinary centers should be established only when a dedicated group of faculty members express a desire for such a center and can show that its creation will permit some objective to be accomplished which can not be accomplished under the departmental system. Centers should not be created by the University administration and foisted on a reluctant faculty. A successful center depends upon the support of the faculty and that support is best obtained by spontaneous and/or induced generation within the faculty itself.

When a center is created, its objective and function should be very clearly defined in a charter. Each center should have a scope of activity which is sufficiently broad to permit accomplishment of its objective, but which nevertheless provides focus for its own staff members. Experience has shown that a center which sets out to study anything and everything ends up studying nothing.

We have seen a wide variety of structural organizations even on this campus. Such variety is inevitable and should not be stifled arbitrarily. However, some general principles govern the relationship of centers to the academic departments. If an interdisciplinary center has no responsibility for curricula, the admission of students and the requirements for graduation should be established by the participating departments and the degrees granted by them. The close relationship of a center to the academic departments is maintained by virtue of joint appointments of all faculty and by the research opportunities that it provides students. All tenured positions are held by the departments. Thus, new permanent faculty are recruited for a program with the advice *and* consent of one or more of the academic departments.

Although this arrangement generates one of the most viable relationships between a center and the academic departments, be they in Engineering or in Liberal Arts and Sciences, it can lead to frustrations. There is no assurance that any department will consider its primary needs for faculty to be in the same area as does the center. Thus, we appeal for flexibility on the part of both the departments and the groups representing the centers' interests as the University moves into new areas of research and service.

There are a number of questions that must be examined as we attempt to formulate research projects and identify research groups and establish centers that are to focus on societal problems. How is the success of the project to be evaluated? How is the problem to be formulated? Who will be involved in the research? How will the project relate to the academic programs of the departments? How will it be administered? How will it be financed?

As we look at these questions, no one of which is independent of the others, it is essential that we have a clear view of what we expect. We must carefully distinguish between the objective of developing new techniques and methodologies that will be useful in solving a general class of problems and the objective of searching for the solution to a very specific problem. It seems unlikely that a research project that is undertaken by the University will solve the transportation problem of the city of Chicago in detail, or the housing problem of St. Louis or even of Champaign-Urbana. But the University does have the capability of making a unique contribution to solving each of these problems by developing new approaches and providing new insight into their ramifications. There is nothing new in this assertion. We simply emphasize that the most productive approach for us is to view ourselves as practitioners of research.

If we accept the premises that the University can and should relate to the problems of the real world, what problems are faced by the individual professor? How does the scientist and scholar relate to a modern technological, engineering, or socioeconomic effort? In addressing these questions, it is useful to characterize the structure and ingredients of a modern, mission-oriented, technological effort.

(1) A modern applied effort involves a team with a highly qualified technical leadership. Since the team usually involves specialists in a number of widely different fields, it goes without saying that the technological project calls for management. Frequently the technical leaders are the managers. Having said that an applied effort calls for an interdisciplinary team, it must also be said that it is not an interdisciplinary committee, nor is it a group of people from different disciplines working in the same building or paid for out of the same budget.

(2) The applied effort is expensive; it often requires sophisticated and costly services and facilities; it calls for decision-making flexibility at the local level in the expenditure of funds.

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(3) The applied research project is directed toward specific goals. It calls for the formulation of a strategy specifying both technological objectives and valid approaches to a problem which is more often stated implicitly than explicitly.

(4) It involves a commitment to a time scale which is known by and acceptable to some sponsor, whether the sponsoring agency be a state or federal government agency, a private business or industry, or a foundation.

(5) In addition to a highly motivated leadership, the applied effort calls for a group of professional personnel who have expert state-of-the-art proficiency in the various fields involved and who provide continuity to the project by a total commitment to its goals.

In conclusion, as we look toward broad interdisciplinary studies of some of the major problems of society, we must carefully consider the relationship of these studies to the graduate programs of the departments. They simply can not stand apart from the departments, for these programs present a valid means of involving students in research on major issues of current importance. Thus, we argue that one of the principal objectives of any such program should be the training of students who can then go out to work, having learned and developed new outlooks toward identified problems.

Our society needs well-trained applied scientists, scholars, and engineers, oriented to the solution of problems posed by society. All too many of our nation's applied efforts are now being guided by members of an older generation — our generation — and this leadership is not being replenished fast enough by younger people who are willing to tackle difficult and complex problems dished up the way society poses them. We must educate new leaders and also help provide the conceptual basis and methodology for meeting our social crises.

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Long-Range Planning

FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

VOL. 1, NO. 2, NOVEMBER, 1969

1980 Projections of Student Numbers and Mix

THE TASK OF THE 70's IN HIGHER EDUCATION FOR THE STATE OF ILLINOIS

The combination of growth in the size of the population of college age, and the increasing proportion of that population demanding college education through to the most advanced degrees, both of which are projected to increase more in Illinois than for the country as a whole, presents this state with the need to provide college educations to about 70 to 75 per cent more students in 1980 than now (fall enrollment 1968 as a base of 100). In actual numbers the increase is projected as an enrollment for the fall of 1980 of about 657,000 on-campus students in this state as compared to an actual figure in the fall of 1968 as a total of 378,085. Moreover, the proportion of that 1980 student on-campus population in Illinois projected to be enrolled as candidates for degrees beyond the baccalaureate will have increased more than that to be enrolled for a first degree. It is anticipated, for example, that in 1980 there will be 19,200 students in Illinois' universities enrolled for the doctorate as compared to 10,500 now, and the number will still be climbing to peak out some years later.

The question of what proportion of the increasing demand for entrance to higher education for the next decade in Illinois is to be met by each of the present colleges or universities, public or private, is a public policy matter of great importance and extreme urgency. Illinois children now alive and presently just entering the public school system deserve as good or better educational opportunities at the higher level than are now provided the people of this state. If Illinois is to maintain itself in the modern highly competitive socio-technological society evolving in America, its children must at least be educated as well as the average child in this country, or we must be prepared to pay enough more than other states as to cause an inflow of necessary talent from elsewhere for the necessary technological, professional, and other services. One way or another, the Illinois of the future will have to invest in its citizens to the degree necessary to maintain its collective competence.

The present rate of technological and other development indicates that the store of knowledge available to be taught to students doubles every ten years. Students of the future must be taught much. To teach much, teachers will have to learn much. To learn enough to do the job of teaching in higher education properly, teachers themselves must be continuously learning so as to keep up with the flow of their subject matter. The capacity of universities to provide the environment in which their teachers can do this will differentiate the great from the mine-run university of the future. The university which can provide its academic staff with the time and facilities for sound, hard scholarship and for high-level relevant basic and applied research will be the academic pacemaker of tomorrow and the university in public demand for leadership.

In turn, any university which receives from its supporters the needed facilities and opportunity for excellence accepts the sobering responsibility for top-level academic performance. A public university achieving pacemaker status sets by example the pattern for academic excellence among its sister universities and other institutions of higher education. No state planning for its own expanding future and for adequate service to its future citizens can be assured that all of its public supported institutions of higher learning will achieve national eminence. No state can afford to overlook development of its own pacemaker university. The pacemaker university for the State of Illinois should be a national leader. It should provide the public which supports it with competent leaders in all aspects of human concern, including agriculture, education, business, entertainment, government, industry, medicine, the arts, recreation, science, and especially in those areas relating man to man and man to his environment.

THE POSITION OF THE UNIVERSITY OF ILLINOIS TO HIGHER EDUCATION IN THE STATE

It is the avowed purpose of the Urbana-Champaign campus Long-Range Planning Committee to insist that the University of Illinois continue to be developed as the academic pacemaker of higher education for the State of Illinois and the nation.

There are a number of reasons for this insistence. First, by any standards applied in academic circles, the University of Illinois now ranks as one of the top ten universities in America. It is one of the top five in federal support afforded its scientists. It is especially strong in the natural sciences, in agriculture, and in engineering. In the area of its relative weaknesses, it can be readily strengthened to levels competitive with the better universities of the country.

Second, it is the only land-grant university of the State of Illinois. Not only is the University's history replete with evidence of its scholarly and scientific accomplishments, but it has an exemplary record of basic service to the citizens of the state, which was the primary idea for the establishment of the land-grant universities in the first place. Moreover, the land-grant university idea originated in Illinois and this University has been associated with it in a hundred-year experience of successful fulfillment.

Third, the University of Illinois has the statutory responsibility for the operation of the Illinois Agricultural Experiment Station, a federal-state partnership originating in the minds of its first regent, John Milton Gregory, and its first secretary of the Board of Trustees, Willard C. Flagg. It has similar statutory responsibility for operations of the Cooperative Extension Service in Agriculture and Home Economics. It has the only Engineering Experiment Station in the nation.

Fourth, through gifts of its alumni and friends the University now has the outstanding university facility in the country for growth and development in teaching and illustrating the performing arts. The University of Illinois' Krannert Center for the Performing Arts ranks among the top two or three such installations anywhere. If properly developed, it could become a brilliant arts and cultural center for mid-America.

The transference to another university of these responsibilities and accomplishments, and of the accrued image of the University of Illinois for service to the state and the nation, would not only be wasteful but impossible. But to let these hallmarks of the excellence of the University of Illinois slip into mediocrity would be a crime against the citizens of this state.

To maintain the national position of the University of Illinois requires careful long-range planning for change and adjustment to need, it requires continued liberal support from the state and the dedication of its faculty and staff to the ideal of superior service by learning through research and by teaching resident undergraduate, professional, and graduate students and nonresident extension teaching to the people of Illinois. To meet the needs for educational leadership in the many and various areas of its subject matter responsibility, the University must assay carefully its total commitment.

THE PROJECTED SIZE OF THE 1980 STUDENT BODY AT THE UNIVERSITY OF ILLINOIS, URBANA-CHAMPAIGN CAMPUS

To meet the needs of Illinois for educated men and women, and to maintain as best it may the excellence of its teaching, scholarship, research, and service, it is proposed that a limitation be placed upon the total number of students enrolled on the Urbana-Champaign campus in 1980, and that future growth in enrollment be primarily at the graduate and professional level. Supportive studies indicate that the demand at all educational levels and disciplines for admission to this University in the 1970's will be significantly greater than the number of places which can be made available and still follow policies of admissions, buildings, staffing, and funding which would not be disruptive of the basic function of the University during that period of growth.

1980 Enrollment Ceiling — 39,200 On-campus Students. The procedure and rationale for establishing a ceiling of 39,200 total enrollment and for distributing this total by level of student follows.

First, in December of 1968, each of our colleges, departments, institutes, etc. were requested by the Vice Chancellor for Academic Affairs to submit estimates of desirable student growth in its own area of academic, research, teaching, or public service responsibility and to comment on a best overall goal for campus student enrollment in 1980. Later, each faculty member was invited to submit recommendations which included judgments about eventual numbers of students in their own field and in the total University. An assay was made of the need for growth of the total state facility to provide adequate higher education for its oncoming population of college age, of the recent history of the state in provisioning its higher education arm, and of the impact of growth on the ability of a university to maintain its top priority as service to students. In short, it was decided by this Long-Range Planning Committee that the disruptions to primary function ought not to exceed greatly the level occurring during recent years. That level of physical growth, roughly equal to a net gain of 250,000 square feet of academic space per biennium, would accommodate a growth rate of approximately 2,000 lower division undergraduate students per biennium, and if the growth were confined solely to advanced graduate students, far fewer could be accommodated. Since the Master Plan of the Illinois State Board of Higher Education limits future lower division enrollments at the state's four-year universities and the state demand for higher levels of education is so great, a major part of the projected growth to 1980 is to be in graduate students.

The First Department, Institute, and College Reaction to the Size Problem. This first response indicated a strong desire to limit overall on-campus enrollment to somewhere between 35,000 and 40,000 students. Summating the estimated optimum and desired future numbers for each of the respondents, however, resulted in an aggregate figure of 48,740 students composed of 32,235 undergraduates (an increase of 40 per cent over 1968) and 16,505 professional and graduate students (an increase of 85 per cent over 1968). Applying current standards to an analysis of the resources required to meet this level of enrollment indicated that the overall campus teaching load would increase by 75 per cent, the number of senior staff (assistant professors and above) would have to double, and new construction of building space would have to approximate 66 per cent of the existing departmental space to say nothing of auxiliary space for student services, library, parking, recreation, etc. These estimates and the financial implications for such growth in comparison with past performance indicate that the University can not expect to meet such a growth projection. They suggest a need for limitation and compromise.

Response to the Individual Faculty Questionnaire. The faculty, too, felt that the ultimate size of the total student body on the Urbana-Champaign campus should be limited to between 35,000 and 40,000. Again, however, most faculty members felt that his or her own immediate field deserved an allocation of students which would sum to a greater figure.

Distribution of Enrollment by Level of Student — The Student Mix. The projected overall enrollment target as recommended by the Long-Range Planning Committee for the fall of 1980 is to be made up of 24,000 undergraduates, 1,600 professional students, and 13,600 graduate students distributed as follows:

Year	*F-S*	*J-S*	*Prof*	*GI*	*GII*	*Total*
1980	11,000	13,000	1,600	5,400	8,200	39,200

A Recommended Growth Pattern by Mix. A desirable pattern of enrollment growth for the next decade follows:

Year		*Headcount Student Numbers*				
	F-S	*J-S*	*Prof*	*GI*	*GII*	*Total*
1968	11,856	11,093	853	3,597	4,451	31,850
1970	11,500	12,100	875	4,100	4,800	33,375
1972	11,300	12,650	975	4,150	5,625	34,700
1974	11,200	13,000	1,200	4,500	6,300	36,200
1976	11,100	13,000	1,400	5,000	7,000	37,500
1978	11,000	13,000	1,500	5,200	7,600	38,300
1980	11,000	13,000	1,600	5,400	8,200	39,200

These figures reflect the state's Master Plan by limiting enrollment in the lower division. They provide some growth in upper division numbers, and reflect the State Board of Higher Education's estimate on professional need (1,000 Law, 500 Veterinary Medicine, and 100 Medical Sciences). The greatest proportionate change projected is in the substantial increase (about 3,750) of advanced graduate students, those enrolled as candidates for the higher degree, though the estimated increase is about 1,800 for first-year graduate students. These recommended numbers reflect the interest of the faculty in growth and development of graduate programs at Urbana-Champaign but will require the greatest inputs of staff time and facility costs.

The projected enrollment and mix for the years 1970 and 1972 have recently been submitted to the State Board of Higher Education with the University of Illinois' 1970-71 capital budget request. They reflect progress toward the 1980 enrollment and mix recommended by this committee, and they reflect enrollment capacities which can be met if the 1970-71 capital budget request is approved. Beyond 1972, a rapid growth in graduate enrollments is projected for the state as a whole, and it is during this period that the Urbana-Champaign campus must be prepared to expand its graduate programs at a much more rapid rate than at any time in the past. Sound advanced planning must obviously precede this time period.

The Urbana-Champaign Campus Share of Total State Enrollment. It is clear from the demographic data compiled by the University staff offices that an increasing share of the responsibilities for higher education in Illinois must be carried by public universities. It is equally clear that the University of Illinois can not continue to enroll its traditional proportion of the total at Urbana-Champaign. The current total of about 24,000 undergraduates at Urbana-Champaign represents some 10 per cent of all undergraduates enrolled in senior public institutions in 1968. The projected total of 24,000 undergraduates at Urbana-Champaign would be about 6 per cent of all undergraduates enrolled in senior public institutions in Illinois in 1980.

The enrollment in the Graduate College at Urbana-Champaign has traditionally represented a much higher proportion of all graduate enrollments in Illinois public universities than it will in the future. It has enrolled approximately 70 per cent of all GII (advanced graduate) students enrolled in the public universities since 1965 and about 20 per cent of GI (beginning graduate) students. However, the proportion of graduate students at Urbana-Champaign will decrease in relation to the state total in 1980. The GI percentage in 1980 will be about 9 but the GII figure is about 40 per cent, which is, of course, of major importance to the state. This figure emphasizes the key role of the Urbana-Champaign campus in the total of higher education in Illinois. The 40 per cent of the state's enrollment for the highest degrees will include some fields for which the Urbana-Champaign campus is the only or the primary source for the state.

THE UNIQUE ROLE OF THE URBANA-CHAMPAIGN CAMPUS FOR HIGHEST DEGREES IN SOME ESSENTIAL FIELDS

The College of Veterinary Medicine on this campus is the sole source of any degrees in veterinary medicine in Illinois. At the most advanced degree level, the Urbana-Champaign campus is the primary source in agricultural science, in chemistry, in physical education, in communications, and in library science. It produces half or more of the most advanced degrees granted in the state in the fields of engineering, physical science, physics, and commerce.

THE PROBLEM OF 1980 ENROLLMENT GOALS FOR SUBJECT MATTER FIELDS WITHIN THE UNIVERSITY

On the first estimate it was thought that future enrollment figures could be projected for departments. This proved

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unwise from lack of substantial evidence in some fields. Moreover, national statistics were available on twenty-three broad areas of study which included all the departments and it was decided to use this classification for the first estimates of numbers within the University. The twenty-three broad areas of study are:

- Agricultural Science
- Fine Arts
- Biological Science
- Health Professions
- Veterinary Medicine
- Mathematical Science
- Engineering
- Physical Science
- Physics
- Education
- Physical Education
- Humanities
- Commerce
- Home Economics
- Library Science
- Social Work
- Economics
- Communications
- Languages
- Social Sciences
- Labor and Industrial Relations
- Psychology
- Law

Based on the last five-year average trend rate for student numbers in these twenty-three areas, a straight line growth projection to 1980 was estimated for each area of study. This technique has widely recognized limitations. Among these is the fact that based on past experience it does not define new areas of study the future will require. It has some less well recognized strengths — it yields trend estimates having more validity than those projected from data on but a single year; it tends to dampen abrupt changes in direction, a fact clearly advantageous for purposes of providing time for additional study about new directions. Moreover, its limitations are so well recognized that no one should dignify such projections with the sanctity of omnipotence. Use of five-year running averages for each field of study each year of the 1970 decade should result in trend estimates close to reality. The broad areas now defined permit maneuver of student numbers within areas more readily than would departmental quotas. However, with continued use, experienced judgment and management may be necessary to permit incorporation of new areas of study not now included.

During the summer of 1969 a statement of the projected 1980 numbers of students and the mix recommended for each of the twenty-three broad areas of study was distributed to each of the administrative officers responsible for that field. After consultation with the deans and directors, the Long-Range Planning Committee has developed a set of *tentative* target figures which is the current estimate of the 1980 numbers of students in each level of study for all of the twenty-three areas of study conforming to a total student on-campus population in the fall of 1980 of 39,200. The distribution of this total to departments as negotiated with deans and directors has been published in a study by the Office of Space Utilization entitled "Preliminary Estimate of Physical Facilities Required at Urbana-Champaign — 1968, 1971-1975, 1980." This study has been provided to each department office.

These negotiated numbers are target estimates only and each year of the 70's should be reassayed and directions corrected. They may be considered as approximations believed now to be consistent with available evidence of need. They will soon be used as a basis for acceptance of students. Care needs to be exercised that strict adherence to them does not cause the University to be unaware of and to resist enrollment pressures resulting from the generation of new need by the state. It is quite probable that enrollment targets in certain areas will not materialize and that targets in other areas are below what can be expected from developing changes in trends.

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Long-Range Planning
FROM THE LONG-RANGE PLANNING COMMITTEE
University of Illinois at Urbana-Champaign

VOL. 1, NO. 1, OCTOBER, 1969

The Long-Range Planning Committee — Its Charge

A Long-Range Planning Committee for the Urbana-Champaign campus was formed in February of this year. The purpose of the Committee is two-fold. The State Board of Higher Education has requested that each public supported institution submit as a part of its next budget request (July, 1970) a long-range program and building plan for the next decade and a general campus land use plan for the coming fifteen years. To this end the Committee is preparing a preliminary planning document which will provide maximum flexibility to the campus in the formulation and development of future academic programs. Second, and more significantly, the Committee is establishing a system by which the entire campus community can participate in the planning process. The need for planning is, of course, obvious in our campus community. The setting of goals, the selection of proper courses of action and appropriate organizational forms, and the discussion of future enrollments, innovative programs, and adventuresome educational policies are all important forces which can contribute significantly to our focus upon a continuation of academic excellence on this campus.

The Urbana-Champaign Campus Long-Range Planning Committee is made up of nine faculty members, a graduate and an undergraduate student member, and several staff members who are assisting the Committee by providing special expertise in the development of planning and budgeting systems, manpower forecasting, spatial and aesthetic considerations for the campus, and models for academic decision making. From time to time special studies have been, and will be, commissioned. Subcommittees are currently examining or initiating studies in certain policy areas — such as the admissions quota system, the establishment of interdisciplinary units, the improvement of undergraduate education, and the impact of postdoctoral programs. It is envisioned that the other subcommittees, representative of the wide variety of campus interests, will continue to be appointed to study selected areas of interest to this community and to make proposals for progress.

The planning process which is evolving for the Urbana-Champaign Campus has two dominant characteristics:

1. It is a democratic sensing of opinions and views concerning the goals and objectives of the faculty, the students, the colleges and departments. The continuing sampling and study process is designed to obtain information about commonly desired objectives.
2. The information collected on desired goals, objectives, and changes will establish a foundation for the equitable allocation of resources on this campus. This process will necessarily be incremental: a unit by unit achievement of the overall goals. Once the common directions for the campus are established, this community can organize its efforts and resources and set up review procedures to assure gradual and meaningful progress toward stated objectives.

It should be emphasized that the planning process for this campus is just beginning to evolve — that it shall never be complete. The clarification of our institutional goals is a continuous task. This task must be constantly reinforced by the development and evaluation of alternative means to achieve our goals. In the face of virtually unlimited demands and constrained resources, wise choices on the allocation of scarce resources among competing demands will result in the attainment of a larger number of objectives.

The planning recommendations will eventually have considered inputs from various sources, among them:

Individual Faculty Members
Faculty Committees
Student Committees
Colleges
Departments
State Board of Higher Education

The sampling and study of these and other sources of information will be deliberated constantly and an annual report will be formulated and communicated to the campus community. Ideally, in the eventual operation of the planning function, the Long-Range Planning Committee will annually review the progress of the campus and will evaluate the movement of its components toward priority objectives. At the same time, the Committee will continually develop new priority objectives in response to external and internal developments. The Committee will continually attempt to match the strengths and desires of the University community to the needs of its constituencies. The planning function must necessarily then be both a continuous initiating and responsive activity.

The output of the Long-Range Planning Committee will eventually include a priority ordering of programs and recommended courses of action for the improvement of existing University functions, and for new intellectual endeavors. These recommendations will be based on the existing environment as well as systematic forecasts of the environment in which the University will function in the future. In all of its deliberations and recommendations, the Committee will attempt to appraise potential courses of action to enhance educational quality at all levels on this campus.

REPORT ON THE RESULTS OF THE FACULTY SURVEY ON "1980"

The purpose of this and later reports on Long-Range Planning is to communicate to the campus community the subject of current Long-Range Planning Committee discussion and deliberation. The Committee believes that formal and informal reviews of all members of the University community are essential. This document will be published periodically in order to encourage the discussion of long-range plans throughout the campus. The current issue is devoted to the results of the faculty questionnaire, "Survey on the Look of the Urbana Campus in 1980," which was mailed to the faculty at the end of the spring semester.

The questionnaire was intended to provide the Long-Range Planning Committee with some preliminary insight into faculty opinion. The results of the questionnaire have been an important major contribution to the Committee, and responses to "open-ended" questions are still being studied. Some of the results of the questionnaire are reported here in order that you might share with the Committee some of the background material which it is using in its planning deliberations.

THE FACULTY POPULATION REPRESENTED BY THE RETURNS

Response to the faculty questionnaire was gratifying. Of 2,654 questionnaires sent to all faculty with rank of instructor, assistant professor, associate professor, and full professor, 1,241 completed and usable questionnaires were returned for a 47 per cent return. The distribution of returns among the various colleges and major units produced a representative distribution roughly proportional to the distribution of the total faculty among all the colleges. The distribution of returns by rank was as follows:

41 per cent Professor
23 per cent Associate Professor
25 per cent Assistant Professor
11 per cent Instructor

This again is roughly comparable to the proportional distribution by rank of the total faculty at Urbana-Champaign. One-half of the respondents have been on the faculty of the University of Illinois for a period longer than seven years. One-quarter of the respondents have been members of the faculty for less than three years and one-quarter have been members of the faculty for three to seven years.

About one-half of the respondents claimed graduate teaching and research as their primary interest while one-quarter of the respondents claimed undergraduate teaching as their primary interest.

SIZE AND DISTRIBUTION OF CAMPUS ENROLLMENT

The first set of questions on the faculty questionnaire concerned the most desirable size of the future student body, and the distribution of this enrollment by student levels. The Committee's deliberations were influenced significantly by the response to this section of the questionnaire.

Approximately 87 per cent of the respondents desired that some enrollment ceiling be established by 1980. Over two-thirds of all respondents desired that this ceiling be less than 40,000 students. While 25 per cent of all respondents desired a uniform expansion of present enrollment patterns with the same relative distribution of graduates and undergraduates, the rest of the faculty desired that undergraduate enrollment be reduced or maintained at its current level of about 24,000 while graduate enrollments be permitted to provide all future enrollment growth to 1980.

The faculty was asked to indicate what they felt to be the most desirable distribution of students by level for the fall semester of 1980. The 1958 and 1968 actual percentage distributions are presented below (as they were in the questionnaire) along with the values most often indicated as a preference for 1980 (mode). These values were also the median values chosen for 1980.

	1958	*1968*	*1980*
Freshmen-Sophomores	40%	39%	34%
Juniors-Seniors	37%	36%	35%
Professional Students	2%	3%	5%
Graduate I (Beginning Graduates)	12%	9%	15%
Graduate II (Advanced Graduates)	9%	13%	15%
	100%	100%	(*)

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* Should not necessarily total to 100 per cent.

If it is assumed that the questionnaire returns do indeed represent the desires of the faculty, it can be interpreted that our future growth should be planned primarily at the graduate level and that this future growth be within a total enrollment of approximately 40,000 students. The expressed desire to limit freshman-sophomore enrollments is coincident with the State Board of Higher Education Master Plan, and the desire to increase significantly graduate enrollments coincides with departmental and college plans submitted earlier this year.

ORGANIZATION OF ACADEMIC UNITS AND COLLEGES

On the whole, the faculty visualizes that new development and change over the next decade can best be approached within the existing college and departmental administrative structure. There was evidence of the need for some changes, but that any reorganization should be approached through existing internal structures. Many of the respondents (35 per cent) anticipate the development of new interdisciplinary programs and they provided brief descriptions of future desired programs. These suggestions are being studied in detail. The organization of the new interdisciplinary programs will probably evolve from within the existing administrative structure and will be a product of faculty interests and needs.

The Long-Range Planning Committee will present at some future date an analysis of those interdisciplinary programs which have been suggested most frequently. The Committee will also attempt to establish guidelines for the efficient establishment and effective operation of a variety of combined faculty endeavors.

OBJECTIVES AND PROGRAMS

The faculty was asked to rank the commonly stated goals of graduate and professional education according to their expected priorities in 1980. These objectives, in order of priority, are:

1. Educating research scholars,
2. Educating college teachers,
3. Educating professional practitioners.

Two innovations which appear to be among the most significant future trends in graduate and professional education are a larger number of interdisciplinary research programs and increasing experience with a computer. These developments were envisioned by about two-thirds of the respondents. Postdoctoral training and the initiation of new postmaster's level programs other than the Ph.D. are two areas which should develop rapidly during the next decade. New teaching technologies will be applied to some extent at the graduate level. There is indication that graduate course requirements will become less specialized, more liberal, and that students will be permitted more freedom of choice, with more work being taken outside of one's major, more emphasis being placed on early clinical or field experience, and with the complete elimination of the language requirement. There was very little desire among the responding faculty to eliminate the master's thesis or to shorten the time to complete the existing doctorate degree.

The questionnaire presented the faculty with a list of broad, major social problems to which the campus might address itself in new and/or expanded programs of teaching, service, and research. Because of the increased interdisciplinary activity envisioned for the next decade, it might be assumed that replies to this question are an indication of the areas in which the faculty desires to develop problem oriented programs.

Approximately 70 per cent of the respondents indicated continuing education, environmental quality, and information storage and retrieval as being those programs with which the campus should be most highly involved. The order in which all the respondents cumulatively indicated their interest in the given choice of major social problems is presented below. From college to college the areas of major interest varied somewhat.

Those programs in which the campus as a whole should be highly involved. (The opinion of more than 50 per cent of all respondents.)

Continuing Education
Environmental Quality
Information Storage and Retrieval
Population Explosion

Those programs in which the campus as a whole should be somewhat involved. (The opinion of less than 50 per cent of all respondents.)

Racial Discrimination
Urban Renewal
Poverty
Transportation
Ethnic Programs
Low-Cost Housing
Crime
Student Activism
Disarmament

Responses to the questionnaire were cross-checked by college, by rank, and by years of service on the faculty of the University of Illinois. Throughout the issues raised in the questionnaire, there were no significant differences of opinion from college to college, but there were definite preferences indicated by particular college units for certain of the social program involvements. This data will be analyzed in more detail and will be treated in a subsequent issue dealing with the Committee's approach to interdisciplinary programs.

Responses from senior faculty and from faculty with over seven years of service at the University compared to responses from junior faculty and from faculty with less than seven years of service at the University revealed a strong correlation between the goals and objectives of the two groups. Although there were no significant differences in the responses of the two groups to the involvement of the campus in certain social programs, there was some very limited indication that the "older" (seven years or more on the faculty), "senior" (full professors) staff expressed a somewhat greater interest on those areas of involvement where the faculty has established technological strengths, particularly environmental quality and information storage and retrieval. There was also very limited indication that the "younger" (less than three years on the faculty), "junior" (assistant professors) staff expressed a somewhat greater interest in those areas of involvement where the faculty has developing societal strengths, particularly urban renewal, poverty, and ethnic programs.

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